PAINT and VARNISH Production

E TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

OUTHERN
PAINT
ONVENTION
AND
EXHIBIT
See Page 48

ARCH,
958

per copy

NEWPORT GLOSS OILS

N-GLO-5Y

N-GLO-5 **NU GLO**

The Cream of Them All

These are the tried and proven products, standard in the Paint Industry. They are known for their paleness, uniformity, quality, and economy. When using Gloss Oils be sure to try any or all of the above in your formulations. Write for samples.

NEWPORT INDUSTRIES Co.

A Division of Heyden Newport Chemical Corporation
342 Madison Avenue—New York 17, New York

When a fine finish counts

specify Shell Chemical products for surface coatings

If you make surface coatings—protective or decorative—you'll find the answer to both quality and economy in solvents and resins from Shell.

Shell's family of *solvents* meets or exceeds highest standards, providing complete formulating flexibility. For resistance to abrasion, impact and chemical attack, Shell's *Epon® resins* are proving unsurpassed in a wide range of coating applications.

And, in the manufacture of alkyd resin and ester gum coatings, Shell *glycerine* assures both quality and performance.

For information and technical literature on specific products to solve your specific needs, write to:

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CHEMICAL SALES DIVISION

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Acetone
Bisphenol-A
Diacetone Alcohol
Di-tertiary-butyl Peroxide
Epon® Resins
Ethyl Alcohol
Ethyl Amyl Ketone
Glycerine
Hexylene Glycol
Isopropyl Alcohol
Isopropyl Ether
Mesityl Oxide
Methyl Ethyl Ketone
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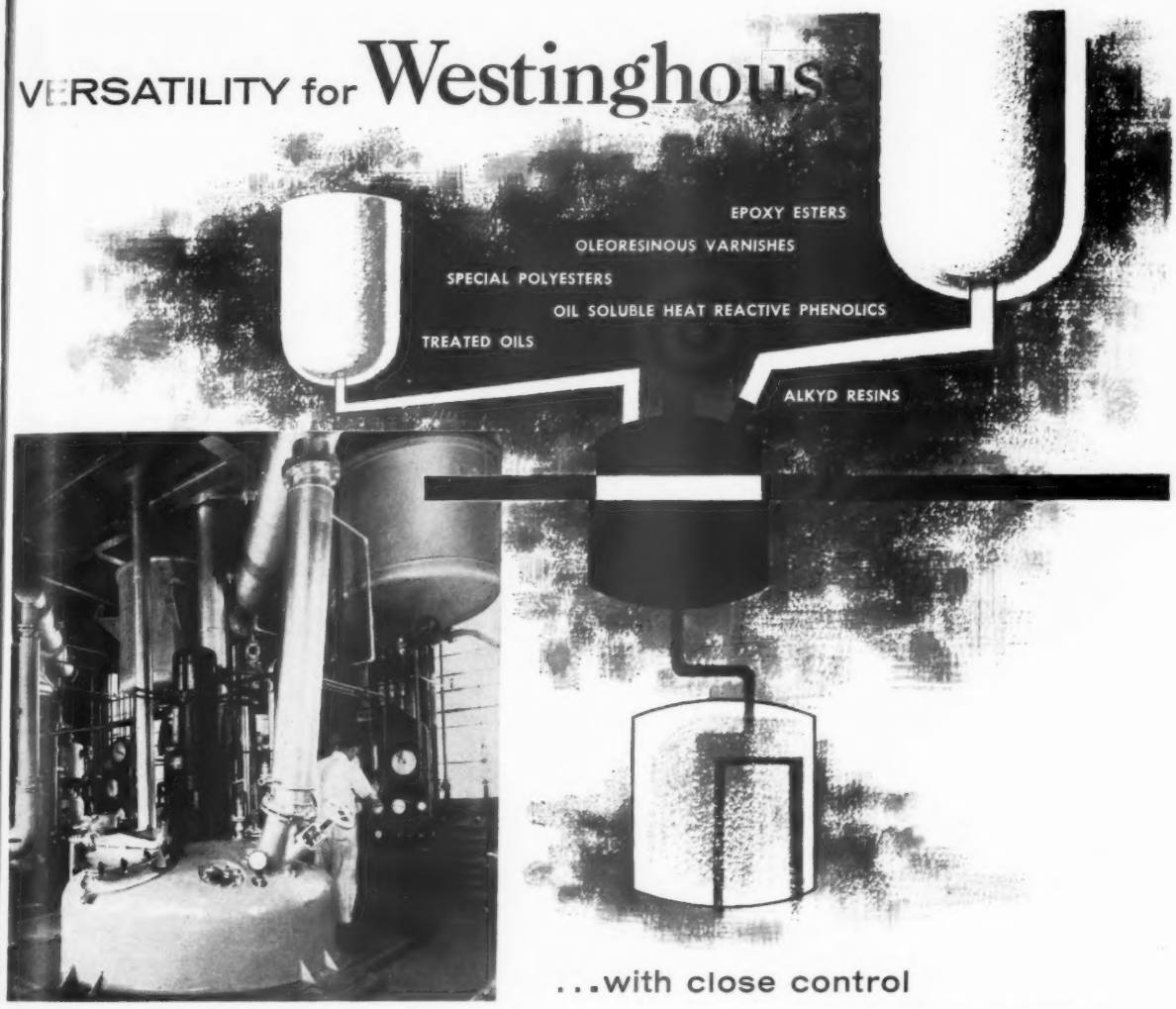
Methyl Isobutyl Ketone
Neosol® Solvent
p-Tertiary-butyl Benzoic Acid
Secondary Butyl Alcohol

SHELL

VERSATILITY for Westinghouse



...with close control of product quality!

Patterson RESIN SYSTEMS

From a single Patterson resin plant—many dependable products for Westinghouse service! And underscoring dependability is the very close control of product quality afforded in every case.

One of two Patterson systems installed in the Westinghouse Benolite plant at Manor, Pa., the installation pictured produces oleoresinous varnishes for electric insulation, alkyd resins for appliance finishes, thermosetting phenolic varnishes and polyester resins for impregnation of electrical apparatus.

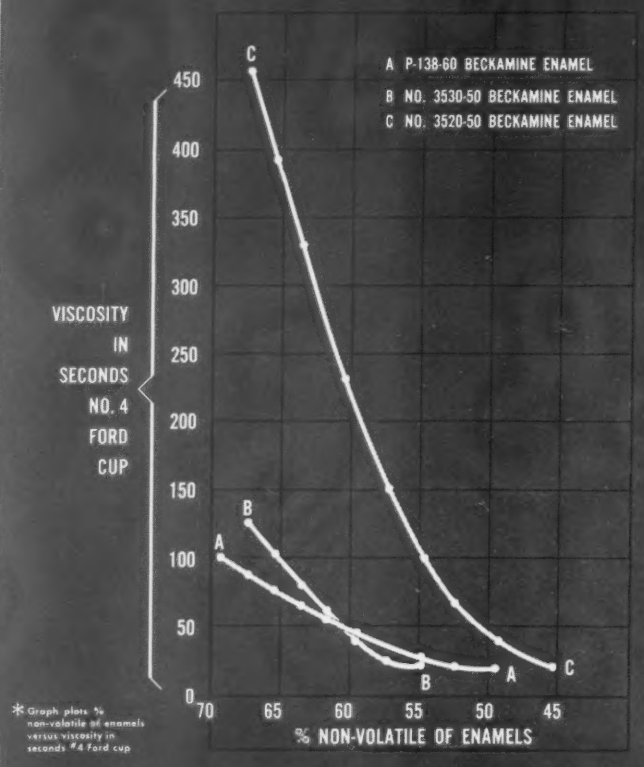
Sharp control plus wide versatility are Patterson processing advantages that can serve *you* to advantage! A Patterson engineer will be glad to detail the facts, at your convenience. Write us.

ADVANCED PROCESS EQUIPMENT OF ENDURING SATISFACTION

THE Patterson FOUNDRY AND MACHINE COMPANY
A Subsidiary of Ferro Corporation
East Liverpool, Ohio

THE Patterson FOUNDRY AND MACHINE COMPANY (CANADA) LIMITED
Toronto, Ontario

*Viscosity Curves of ENAMELS
made with high, medium and low viscosity BECKAMINES



*Graph plots % non-volatile of enamels versus viscosity in seconds #4 Ford cup

For Your Alkyd Enamels –

RCI Beckamine and Super-Beckamine Resins

The above graph gives you an example of the useful type of information you will find in the current RCI booklet on urea and melamine resins. The graph compares the reduction rate of typical low, medium and high viscosity BECKAMINES in a standard white gloss enamel formulation.

If either a urea or a melamine resin is the sole vehicle of an enamel, a very hard brittle film results. Therefore, it is normal practice to combine the urea, or melamine, with a suitable alkyd resin. This succeeds in (1) plasticizing the urea or melamine to improve adhesion and flexibility; or (2) modifying the alkyd with the urea or melamine to improve hardness, color, gloss and resistance to chemicals.

Since ureas and melamines are used in amounts constituting from 5% to 50% of the total vehicle solids for most industrial finishes, we consider the problem from the second point of view; that of modifying the alkyd. Economically, urea resins improve alkyds without greatly increasing final cost since urea prices are in the same range as alkyd prices.

Melamine resins are higher priced but melamines improve alkyd properties materially more than do urea resins.

If you are formulating automotive primers and body enamels, truck and tractor enamels, toy and implement enamels, or wood and metal furniture finishes, you can depend on the wide range of RCI BECKAMINE and SUPER-BECKAMINE resins to provide a product suited to your specifications. Write to RCI today for full information. Ask for *Amine Booklet*.

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PAINT and VARNISH Production

(REG. U.S. PATENT OFFICE)

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 48 MARCH, 1958 NO. 4

NEXT ISSUE

A solution to the problem of flocculation of copper phthalocyanine blue pigment in lacquers and synthetic automotive enamels will be presented in our April issue. This informative article discusses the use of substituted salts of o-carboxy-benzamidomethyl phthalocyanines in inhibiting floc growth.

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Taxes and Small Business

TO help bolster the economy, many of our economists and government officials are urging general tax cuts for business, particularly small businesses who are suffering severe setbacks in the present recession.

According to the latest figures, there are some 4,250,000 small firms in the United States. The Small Business Administration defines a small business as a retailer doing an annual volume of not more than $1,000,000 or a wholesaler with a volume of $5,000,000 or less.

During the post war years, opportunities for small businesses to prosper and grow have been hampered by Federal taxation, which reduced the ability of small firms to plough profits back into their businesses. When the Government takes 30% of earnings under $25,000 and 52% over this amount, it is apparent that the small firms cannot possibly expand. Moreover, this tax burden has restricted the small firms' capabilities to carry on research and development work and pursue a vigorous marketing program. This situation has placed the smaller firms at a disadvantage with the larger enterprises. For many small firms the only alternative was to merge with bigger companies or face extinction. Everyone agrees that small business deserves a better break.

In recognition of the plight of small business, President Eisenhower in his recent Economic Report urged the enactment of certain tax changes as a help to small business. These include:

1. Allow speedy depreciation deduction on purchases of used property up to $50,000 a year. The law presently restricts the speedy depreciation methods to new business assets.
2. Allow corporations with ten or less stockholders to be taxed as partnerships.
3. Permit a deceased person's estate tax to be paid over ten years where his estate consists largely of investments in closely held business concerns.
4. Give original investors in a small business an ordinary loss, up to a specified maximum, on any losses realized on their stock investments.

Coupled with these proposed tax recommendations and the financing and technical aids which are made available by the Small Business Administration, the outlook for small enterprises in our economy is indeed encouraging.

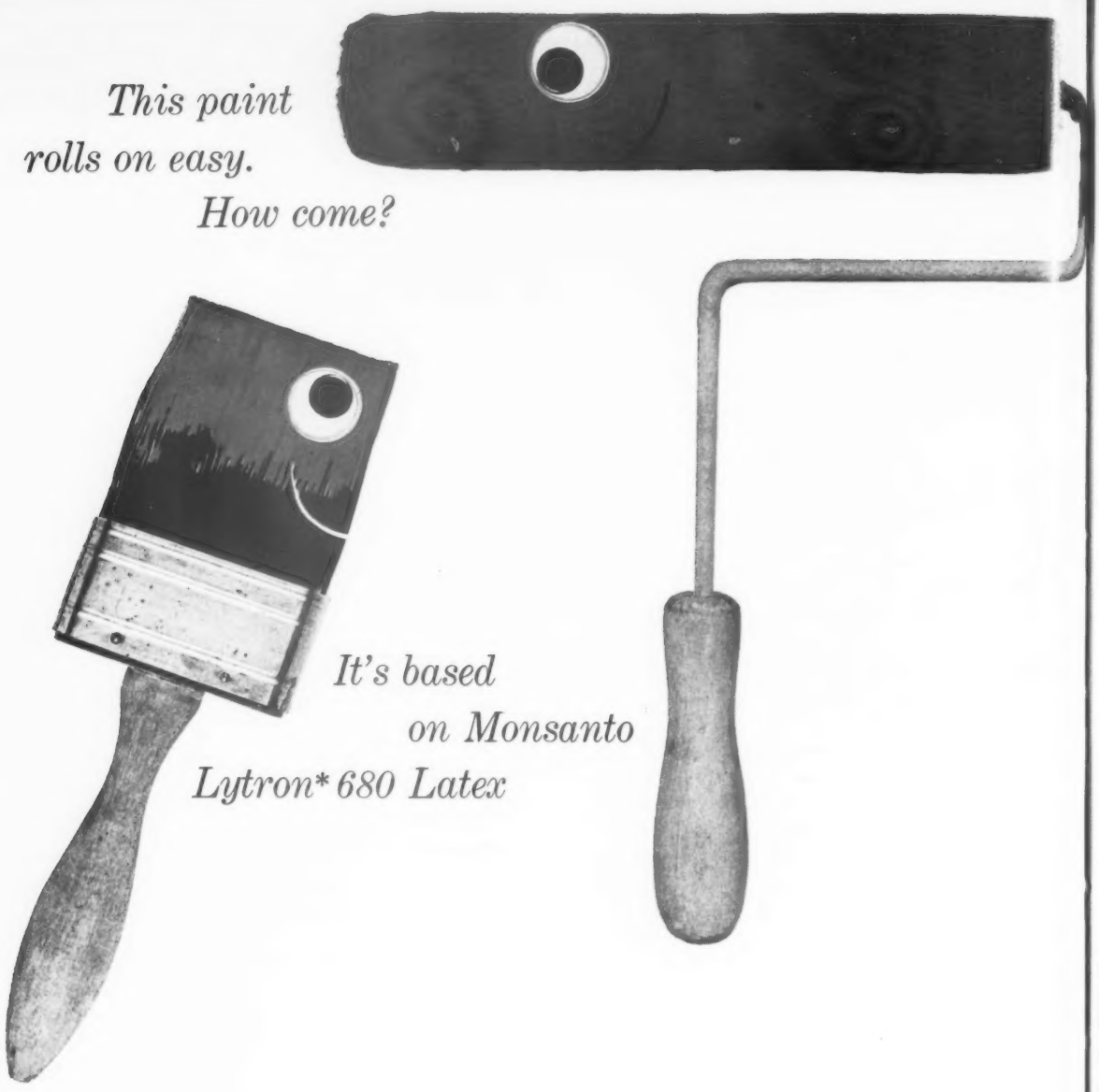
Colorful Post Offices

AS a stimulus to the economy, Postmaster Summerfield recently urged Congress to pass the Administration's program to modernize the postal system. Some $1.5 billion, put up by private investors would be used for new or renovated buildings which the Post Office Department will rent indefinitely.

Like many industries serving the construction field, the paint industry will undoubtedly share in this proposed modernization program. But more important, it will give the paint industry an unusual opportunity to display to the public at large what paint can do in color decoration.

The National, Paint, Varnish and Lacquer Association, in the interest of stimulating more paint sales, is now in the midst of formulating a broad public relations program to bring to the attention of the consuming public the merit of paints. We cannot think of a better place to "show off" paints than the Post Office which serves hundreds of people each day. A unique color scheme through paints can go a long way in combatting other products which are being promoted as superior to paint products for decorative use.

This paint rolls on easy. How come?



It's based on Monsanto Lytron 680 Latex*

Lytron* 680-*based paints flow smoothly, quickly, go easily on wood or masonry*

The field reports about Lytron 680-based paints make profitable reading for the makers of these exterior paints. Lytron 680 can produce smooth films without modification—even below 40° F. These films are water-resistant in thirty minutes. No color mottling, no spotting. They won't rupture on porous substrate. Blistering—even over green masonry—is minimized.

Controlled small particle size assures proper binding of high volumes of pigment, excellent adhesion, color retention, stability.

Lytron 680 paints have a fast drying rate. Clean-up becomes a simple matter with soap and water.

Note: Lytron 680, a chemically unique acrylic-type polymer, can be blended with other latex systems (i.e. styrene-butadiene, alkyds) to realize the best properties of both latices at low cost.

Write for samples and Production Information Bulletin 1028, to Monsanto Chemical Co., Plastics Div., Rm. 331 Springfield 2, Mass.

Monsanto products for the surface coating industry include Amino Resins, Phenolic Resins, and Styrene Latices and Resins.

Monsanto

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(CYCLOHEXANOL)

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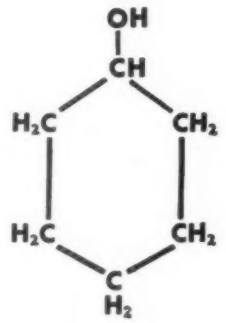

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☐ Please have representative call by appointment.

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Cut solvent costs

by switching to isobutyl acetate

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SAVE
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n-propyl acetate

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Eastman isobutyl acetate offers other advantages, in addition to lower cost and improved final product. The mild, pleasant odor of this solvent is preferred by most people over the stronger odor of many other solvents. Its price is stable. And because it weighs less per gallon than n-butyl acetate, you save over $1,100 on every 8,000 gallon tank car you buy at current prices.

As a result, isobutyl acetate is finding wide acceptance as a lacquer solvent in its own right, as well as a satisfactory replacement for more expensive solvents. For additional information on this Eastman solvent, contact our nearest sales office or write to EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

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SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston.
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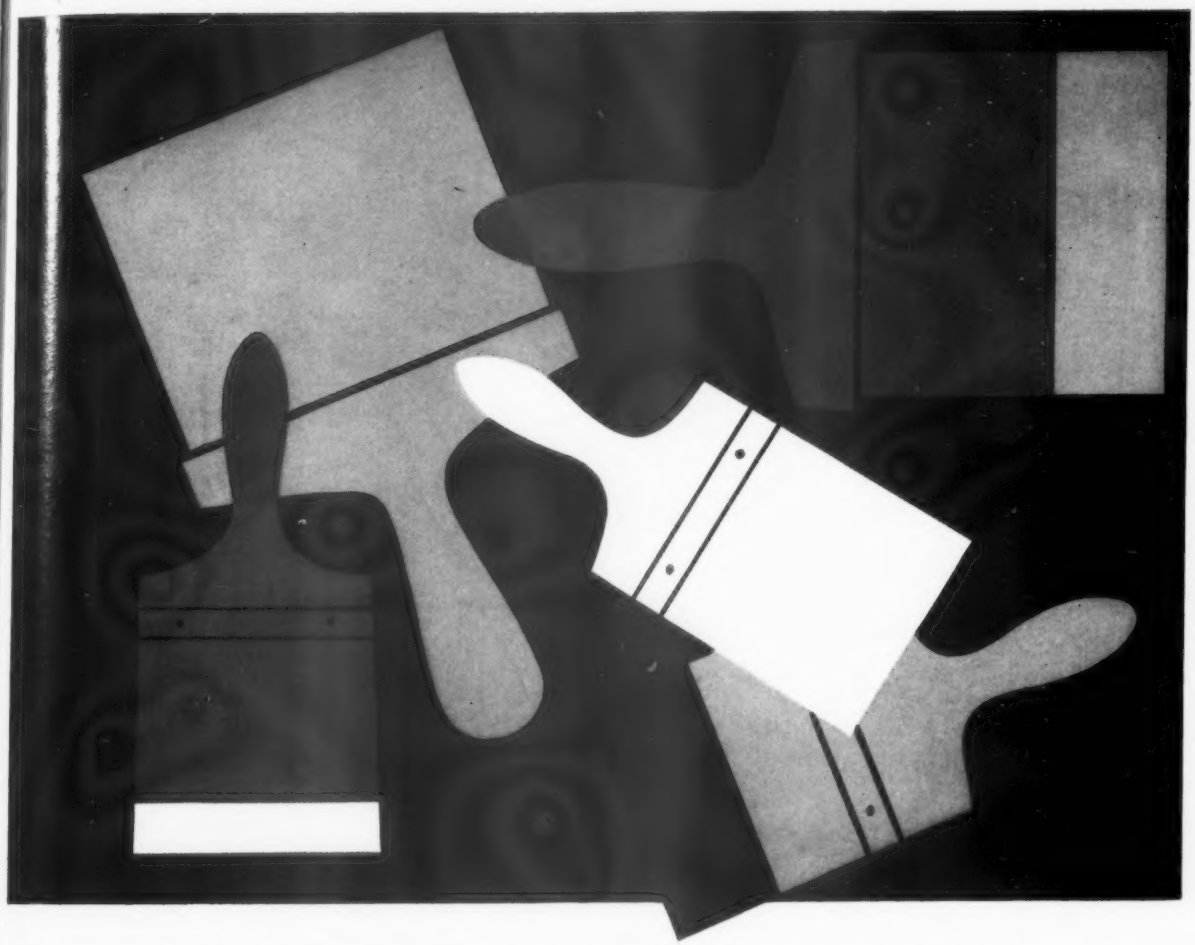

here's why Gelva PVAc emulsions offer more for your money

you can sell the application values of Gelva based paints

Outstanding brushability and leveling are characteristic of paints based on GELVA TS-30. They are two important application advantages which you can sell to your customers. Free filming GELVA TS-30 also has superior stability, optimum distribution of particle size, and an unexcelled balance of properties for a full line of coatings, interior and exterior paints and primer-sealers.

What's more, Shawinigan provides GELVA users with technical service in depth . . . technical service based on more than 10 years experience with commercially proved polyvinyl acetate paints. Shawinigan is ready to give you all the assistance you need to formulate and manufacture exactly the right polyvinyl acetate paint, homopolymer or copolymer, for your market. It will pay you to consult Shawinigan . . . we have the quality and the know-how. Write for our booklet, "GELVA Emulsions for Paint", to Shawinigan Resins Corporation, Department 2203, Springfield 1, Mass.

Success with PVAc paints requires a quality emulsion and expert technical service. You get both from Shawinigan.

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GELVA® *emulsions for paints*

SHAWINIGAN RESINS

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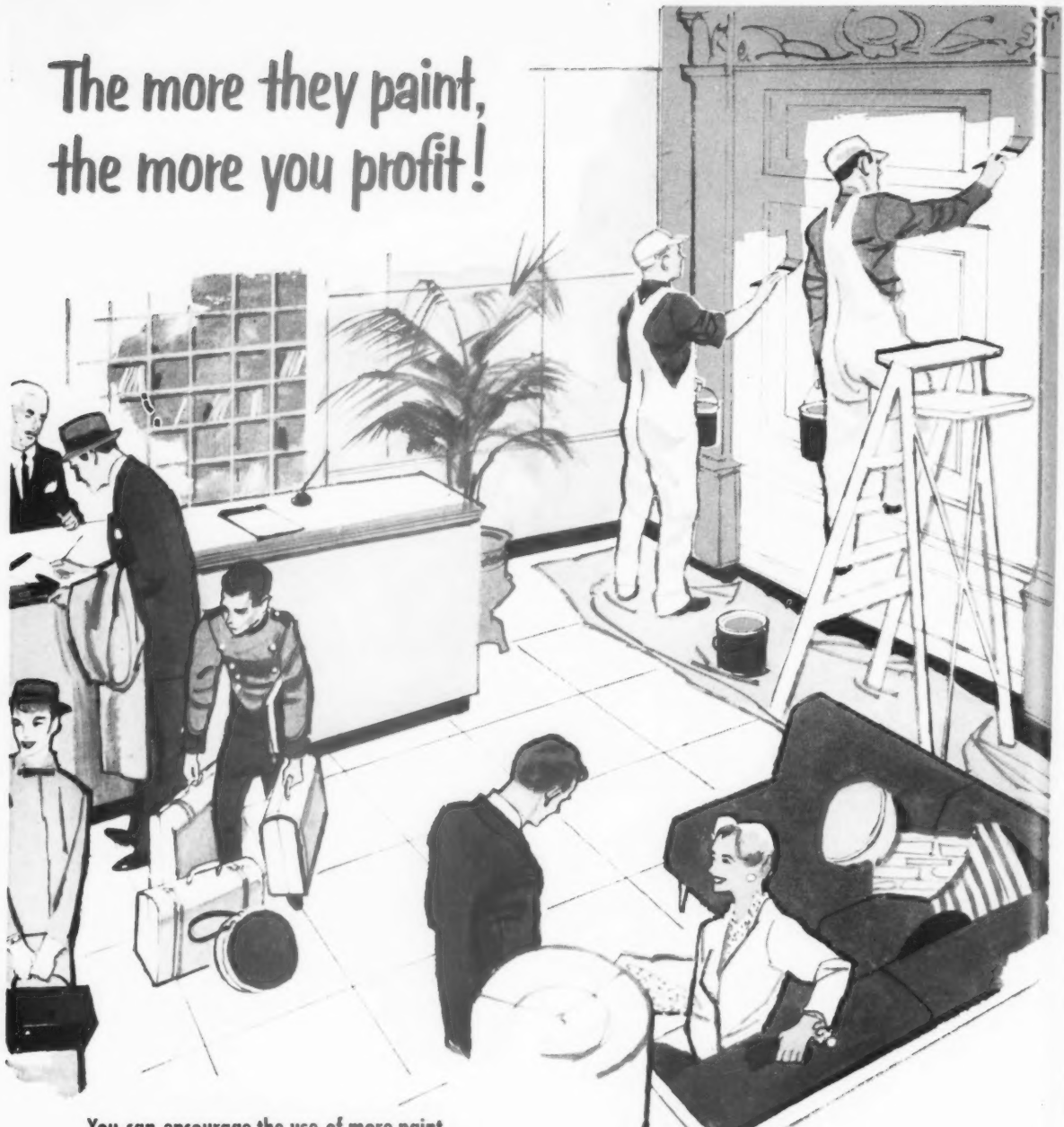

You can encourage the use of more paint when you formulate with *Odorless Soltrol

No stinging odor! No irritating smell! Business can go on as usual during a paint job when paints are formulated with *Phillips 66* ODORLESS MINERAL SPIRITS. And business-as-usual while painting means business-*better-than-usual* for paint formulators! Send for your free samples of Phillips high quality, water-white thinners. Soltrol 130 gives you conventional drying. Soltrol 170 provides longer wet edge.

*A trademark

Also available in split cars

PHILLIPS PETROLEUM COMPANY • Special Products Division

Bartlesville, Oklahoma Bartlesville 6600

The exceptional gloss of this refrigerator finish results from the use of UFORMITE F-222 urea formaldehyde resin in the white baking enamel.

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UFORMITE F-222 offers these advantages:
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Curing speed, color, gloss, flexibility and chemical resistance can be tailored to fit your specific needs by choice of the proper Duraplex alkyd resin from the wide range of drying and non-drying grades available. Send for detailed notes on this distinctive new resin.

Chemicals for Industry

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UFORMITE F-222

Isophthalic-based refinishing enamels

"Photovolt gloss meter reading being made on car repainted with Isophthalic-based refinishing enamel. After repainting, the car was not waxed—has never been garaged, polished and was washed only occasionally. Reading shows 85% of original gloss after 24 months' weather exposure."

85% of original gloss after 24 months' weathering

Here is more proof that Isophthalic alkyds provide superior properties in formulating fast drying, high-gloss automotive refinishing enamels and air drying industrial finishes.

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Let Oronite prove to you how Isophthalic can benefit your products. Oronite field representatives will be glad to demonstrate to you the many advantages of this superior raw material. Just contact the Oronite office nearest you.

Batch Formula for Isophthalic-based refinishing enamel used on above automobile.

Soybean oil	512 lbs.
Glycerol (95%)	167 lbs.
Benzoic acid	60 lbs.
Litharge	0.5 lbs.
Isophthalic	354 lbs.
Monobasic Calcium Phosphate	0.5 lbs.
	1094.0 lbs.
Water (theoretical)	94 lbs.
Yield	1000.0 lbs.

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AND CHEMICAL COMPANY, INC.

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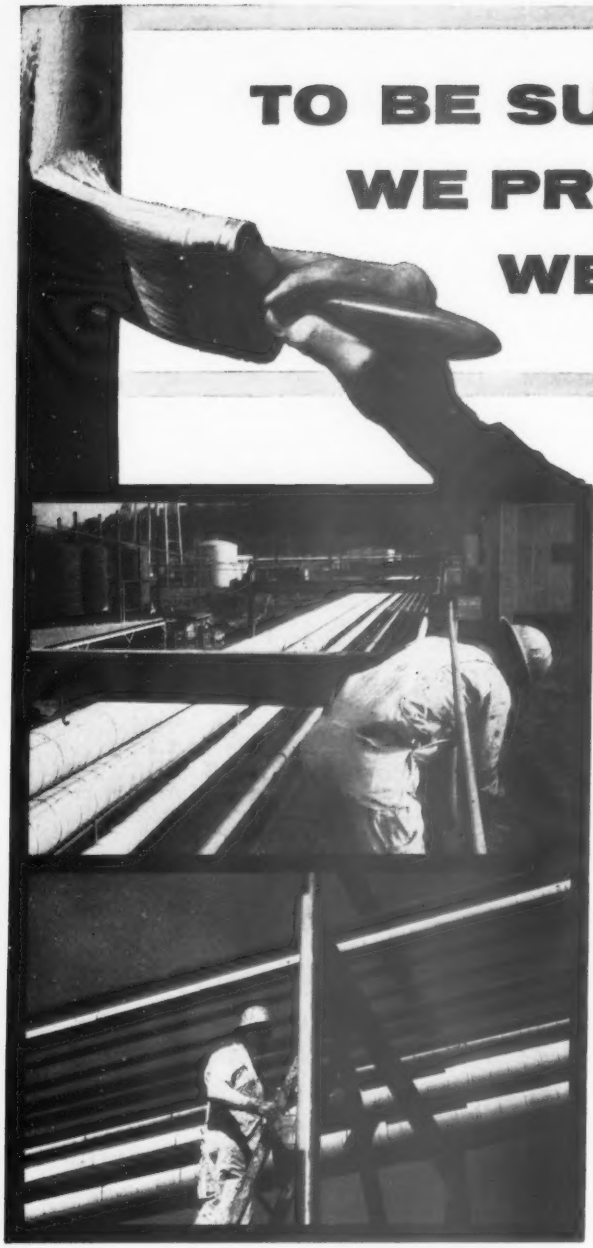

TO BE SURE... WE PRACTICE WHAT WE PREACH!

The photos above show painters applying "9200"-base primer, enamel top coat and blue aluminum paints to giant new Woodmar installation at Washington, West Virginia.

MARBON "9200"

Soluble High Styrene Resins

USED ON OUR MULTI-MILLION DOLLAR WOODMAR INSTALLATION

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for lower vehicle solids at higher viscosity

MARBON 9200 MV & LV
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MARBON 9200 LLV
for higher vehicle solids at lower viscosity

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for low odor, low cost finishes

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We invite you to make a side-by-side check of the properties and performance characteristics of the emulsion you now use and CRILICON X-R. You will find that you can improve your product with no increase in cost. Write today for technical bulletin and samples; specify the types of paints you make.

IF YOU DO NOT MAKE AN ACRYLIC PAINT . . .

Now is the time to start. The superiority of acrylics has been hailed by leading consumer publications; they will doubtless dominate the market for many years. With CRILICON X-R you can ease into this rich market with a truly superior product. And we'll help you get started with technical assistance and marketing aids. The coupon will bring details.

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- ☐ Low Cost Interior and Exterior Flat
- ☐ Low Cost Masonry Coating
- ☐ Low Chalking Masonry Coating
- ☐ High Quality Wood and Masonry Coating
- ☐ Other .....

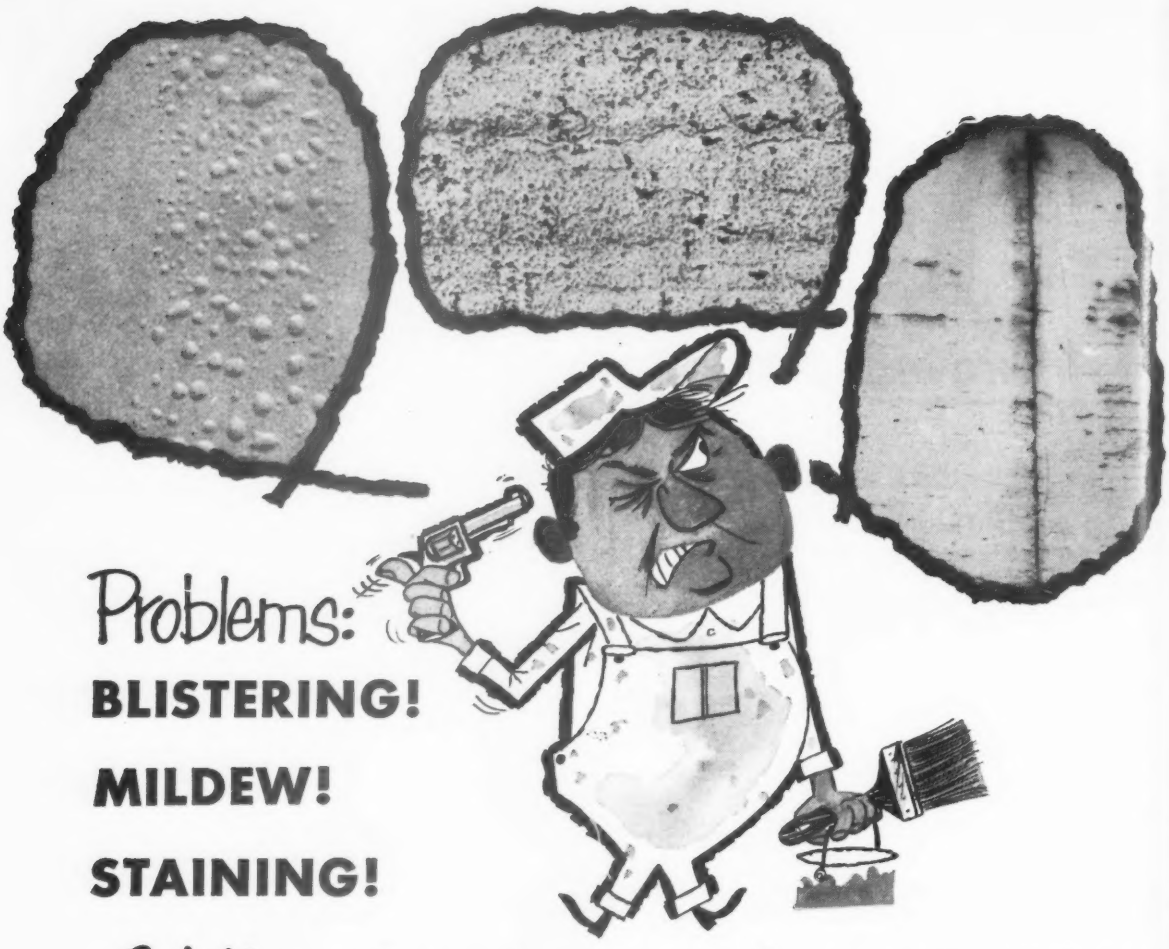
I now make an acrylic paint. ☐ Yes ☐ No

NAME _____

TITLE _____

FIRM _____

ADDRESS _____



Problems:
BLISTERING!
MILDEW!
STAINING!

Solution: Formulate your flat house paints with EAGLE-PICHER Zinc Oxides!

New low-luster or flat-breather type house paints have been able to solve some of the problems posed by wide differences in today's building materials, but they also have created other hazards—blistering, discoloration by mildew growth, and unsightly staining.

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THE CASE OF THE
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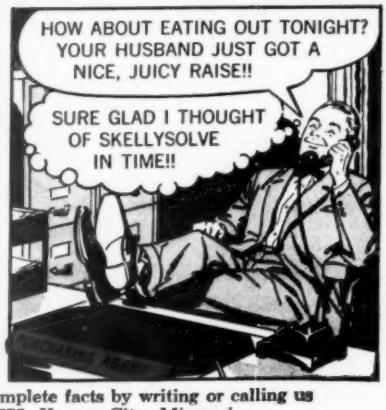

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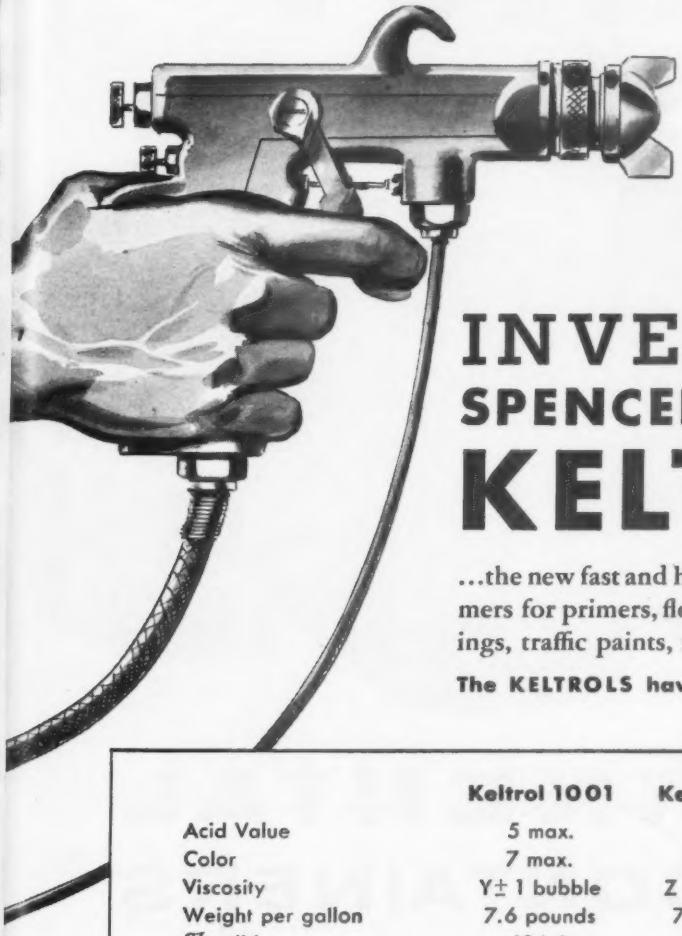

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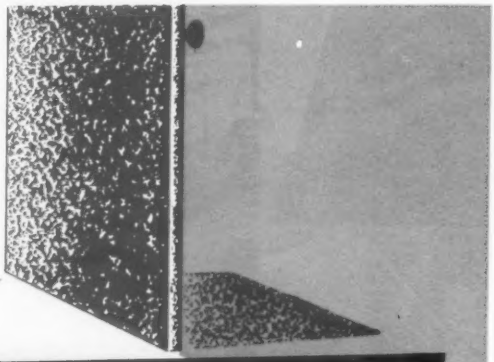

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EXTERIOR RESULTS of EMULSION PAINTS

Study is concerned with exposures made in the development of a modified acrylic synthetic polymer latex for exterior paints.

By

John A. Gordon, Jr.*

J. A. Gordon, Jr.

DEVELOPMENT of a high quality exterior paint vehicle depends to a great extent upon the interpretation of data gained from panels exposed in various areas. On these panels a wide variety of formulations can be exposed, series can be developed and frequently limitations of practical use can be determined. Some of the results of the exposures of a number of different formulations of Lytron 680 paints are discussed here. These exposures were made during the development of this modified acrylic synthetic polymer latex for exterior paint use and it is hoped that the methods will help paint formulators who are interested in latex paints.

Exposure Sites

Three exposure sites were chosen for these developmental series: one at Springfield, Massachusetts; one in southern Florida; and one at Santa Clara, California. Results at the three stations paralleled one another quite well, differing only in degree and in some instances in the specific type of failure which will be mentioned as the various series are discussed. The results reported here are those from the Santa Clara exposure station but they may be accepted as representing the results obtained at the other stations for the most part. Exposure in each area was made at 45° facing south and panels have now been on exposure for two full years. The Florida panels were removed at the 21-month point so that they could be brought to Springfield for comparison with the panels there, but the panels at Springfield and at Santa Clara are going to remain on exposure until failure has been much more pronounced.

Chalking

Preceeding series based on similar polymers produced during the earlier phases of the development of Lytron 680 had indicated that this particular vehicle would have high resistance to chalking. Naturally this is a desirable characteristic in tints but generally speaking in whites it is desirable to have a small amount of chalking. Such chalking provides the cleaning necessary for white paints and also helps develop a repaint surface.

The ideal situation in a latex paint would be light chalking over the entire period of exposure in order that the panels would remain clean but not exhibit excessive erosion. The problem of promoting chalking but reducing the degree of chalking as compared to oil paint is brought about by the fact that the film thickness from any given paint system is about as half as great for latex paints as it is for conventional oil type paints because of the wide difference in total solids in the two systems.

The series exposed to check the effect of variations to produce chalking consisted of five members in which the only variation was the progressive use of anatase free chalking titanium dioxide to replace the rutile non-chalking type. Replacement was made in 25 per cent steps as indicated in Table I so that ratios of rutile to anatase titanium dioxide varied 100 per cent rutile to 100 per cent anatase. Table IA gives the results at 12

* Technical Service Representative, Monsanto Chemical Co., Santa Clara, Calif.

Material	100% Rutile		75% Rutile		50% Rutile		25% Rutile		100% Anatase	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	254.72	7.28	191.04	5.96	127.36	3.64	63.68	1.82		
Anatase TiO_2			63.68	1.82	127.36	3.64	191.04	5.46	254.72	7.28
TPPP	2.33	0.28	2.33	0.28	2.33	0.28	2.33	0.28	2.33	0.28
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85
Talc	133.00	5.39	133.00	5.39	133.00	5.39	133.00	5.39	133.00	5.39
Dispersion Med.	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98
Water	90.30	10.82	90.30	10.82	90.30	10.82	90.30	10.82	90.30	10.82
Lytron 680	410.00	48.40	410.00	48.40	410.00	48.40	410.00	48.40	410.00	48.40
Totals	1161.39	100.00	1161.39	100.00	1161.39	100.00	1161.39	100.00	1161.39	100.00
Total Solids	664.19	39.50	664.19	39.50	664.19	39.50	664.19	39.50	664.19	39.50
Total Pigment	451.19	15.80	451.19	15.80	451.19	15.80	451.19	15.80	451.19	15.80

Table I. Various ratios of rutile to anatase TiO_2 at 40% pigment volume.

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	8	8	8	8.5	8.5	8.5	9	9	9
Chalking	8	6	6	5	5	4	5	4	4	2

Table IA. Chalking and dirt collection in ASTM ratings.

months and 24 months for these five members indicating that with an increase in anatase there is a slight decrease in dirt collection.

Although the member with 100 per cent non chalking rutile showed only an ASTM rating of "8" for dirt collection after 24 months in the Santa Clara area, it showed slightly less dirt collection in Florida, and about the same at Springfield, Massachusetts in a heavy industrial area. So far as chalking is concerned, the member with all rutile is now chalking about an ASTM "6" whereas the member with all anatase is chalking at an ASTM rating of "2" with the other members in the series falling in between.

Observations of this series and the previous series led us to choose a ratio of 60 per cent rutile: 40 per cent anatase for our extensive exterior exposure series and the indications are that this choice resulted in a thoroughly practical white paint which has shown good durability and no excessive chalking for two years, and at the same time it has maintained a pleasing white appearance.

Pigment Volume Concentration

The question of pigment volume concentration has been one of the most critical in the development of latex paints for either interior or exterior service and certainly the problem is accentuated when the paints are designed primarily for exterior use.

Table II shows a group of white paints varying in pigment volume concentration from 30 to 50 per cent in 5 per cent steps. Hiding pigment and clay were maintained at a constant level; and variations in pigment volume concentration were accomplished by increasing the talc content of the paints.

It has long been the opinion of paint chemists that latex paints will not bind sufficient pigment to make them actually practical for exterior use in comparison with oil paints. This has more to do with the economics of paint manufacture than with the physics of paint film durability but is certainly an important practical point and this series was designed to indicate the limitations for the new, fine practicle size, soft polymer latex.

Interestingly enough, the results indicate that even at as high as 50 per cent pigment volume concentration dirt collection is a minor item and chalking is not excessive, which means that the panels will remain clean and erosion will not reduce their durability at an excessive rate. Observation of Table II and the results recorded in Table IIA show that there is very little variation between the 30 per cent pigment volume concentration paint and the 50 per cent pigment volume concentration paint although the pigment varied from 11.9 to 19.75 gallons per 100 gallons of paint with a corres-

Material	30%		35%		40%		45%		50%	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	254.72	7.28	254.72	7.28	254.72	7.28	254.72	7.28	254.72	7.28
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85
Talc	37.50	1.52	85.80	3.47	133.00	5.39	181.50	7.35	228.20	9.25
TPPP	2.04	0.25	2.04	0.25	2.33	0.28	2.66	0.32	3.40	0.37
Dispersion Med.	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98
Water	51.00	6.12	71.50	8.57	90.30	10.82	110.00	13.22	129.00	15.47
Lytron 680	484.00	57.00	446.00	52.60	410.00	48.40	374.00	44.00	338.00	39.80
Totals	1100.30	100.00	1131.10	100.00	1161.39	100.00	1193.92	100.00	1224.36	100.00
Total Solids	592.90	39.50	623.70	39.50	664.19	39.50	686.52	39.50	716.76	39.50
Total Pigment	355.40	11.90	403.70	13.85	451.19	15.80	500.02	17.80	547.46	19.75

Table II. Various pigment volume concentrations in white.

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	9	8	9	8	8	8	8	8	8
Chalking	9	7	9	7	9	8	9	7	8	7

Table IIA. Chalking and dirt collection in ASTM ratings.

ponding reduction in vehicle volume over the range studied.

Here again subsequent exposures of a practical nature have indicated that the observations from the panel series were accurate and a good indication of the results which would be received with plant manufactured paint on actual buildings. It is interesting to note that as the pigment volume concentration increases, the chalke ing remains practically constant over the two years of the observation period, and from this we can conclude that the actual regulation of chalking in latex paints based on Lytron 680 is controlled by the quantity of anatase pigment in the formula rather than the pigment volume concentration. Economically speaking this means that a paint manufacturer can produce good quality exterior latex paint with excellent self-cleaning characteristics at as high as 50 per cent pigment volume concentration without reducing the quality of his product.

Colored Paints

There is a strong tendency on the part of all paint laboratories to do the majority of their testing in whites. This is due partly to the fact that by far the largest volume of exterior paint sold is white. But probably a greater factor is the greater ease of maintenance of a clean laboratory when the majority of the paints produced are white. However, it is always necessary to develop data for the exposure of colored materials, particularly in the southern and western areas where pastels are becoming more and more popular as exterior paints for buildings.

A series of gray paints was exposed in which the pigment volume concentrations were varied from 30 to 50 per cent in 5 per cent steps, just as it had been in the case of the white paint. But now the titanium dioxide was all rutile. The tinting colors were black iron oxide and Italian raw sienna. Clay content was kept constant with those in the white series and variations in pigment volume concentration were attained by varying the amount of talc in the formula. These paints were also exposed at 45° south.

After two years, at all three stations the color retention is good with little difference between the portions of the panels which have been exposed and the areas which have been protected from exposure. Dirt collection has remained at a constant rate for the entire exposure time. There is only a minor difference in the

Material	30%		35%		40%		45%		50%	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	244.50	6.98	244.50	6.98	244.50	6.98	244.50	6.98	244.50	6.9
Mapico Black	5.10	0.12	5.10	0.12	5.10	0.12	5.10	0.12	5.10	0.1
Italian Raw Sienna	5.10	0.16	5.10	0.16	5.10	0.16	5.10	0.16	5.10	0.1
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.8
Talc	38.00	1.54	86.30	3.49	133.50	5.41	182.00	7.37	228.70	9.27
TPPP	2.04	0.25	2.04	0.25	2.33	0.28	2.66	0.32	3.40	0.37
Dispersion Med.	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98
Water	51.00	6.12	71.50	8.57	90.30	10.82	110.00	13.22	129.00	15.47
Lytron 680	484.00	57.00	446.00	52.60	410.00	48.40	374.00	44.00	338.00	39.80
Totals	1100.78	100.00	1131.58	100.00	1161.87	100.00	1194.40	100.00	1224.84	100.00
Total Solids	593.38	39.50	624.18	39.50	671.67	39.50	687.00	39.50	717.24	39.50
Total Pigment	355.88	11.90	404.18	13.85	451.67	15.80	500.50	17.80	547.94	19.75

Table III. Various pigment volume concentrations in gray.

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	8	8	8	8	8	8	8	8	8
Chalking	9	7.5	9	7.5	9	7	9	7	9	6.5
Color Retention	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good

Table IIIA. Chalking and dirt collection in ASTM ratings.

chalking, the 30 per cent pigment volume concentration showing a 7.5 chalking rate at two years and the 50 per cent pigment volume concentration showing a 6.5 chalking. In each case, the chalk seems to be gray and there seems to be very little change in the color of the panel where chalking is occuring.

Corroboration of these results has been obtained through the practical exposure of paints throughout the country in which a gray at 40 per cent pigment volume concentration was exposed with excellent results in all areas to date. Here again the economics of manufacture of higher pigment volume concentration paints without reduction in actual durability should be apparent to paint formulators.

Another pastel formula chosen for exposure was the russet tint based on rutile titanium dioxide and brown iron oxide for the hiding pigments, with clay being added to bring the contents of this portion to the same level as it had been in the white and gray series. Again pigment volume concentration was varied by increasing the amount of talc in the series. Here again it was noted that dirt collection remained at a constant level throughout the exposure series and chalking is almost constant from member to member throughout the two years of exposure. Color retention again was good at all of the exposure stations even for this russet color which is not as permanent as the gray in our estimation.

Although the exposure records do not differentiate between the various pigment volume concentrations for color retention because differences were very slight, it was noted that with this series, color retention in the higher pigment volume concentration is better than at the lower pigment volume concentrations, where the differences noted are differences between the exposed and unexposed portions of the same panels. This is an indication that as pigment volume concentration increases, there is less actual exposure of the tinting pigments so that if it happens to be slightly sensitive, the percentage or degree of change is not as great with the higher pigment volume concentrations.

Modification

The ability of Lytron 680 to accept modifications was the next subject of exposure study. An oil emulsion and an alkyd emulsion were prepared and used as re-

Material	30%		35%		40%		45%		50%	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	183.20	5.28	183.20	5.28	183.20	5.28	183.20	5.28	183.20	5.28
Brown Iron Oxide	71.20	2.85	71.20	2.85	71.20	2.85	71.20	2.85	71.20	2.85
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85
Talc	16.50	0.67	64.80	2.62	112.00	4.54	160.50	6.50	207.20	8.40
TPPP	2.04	0.25	2.04	0.25	2.33	0.28	2.66	0.32	3.40	0.37
Dispersion Med.	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98
Water	51.00	6.12	71.50	8.57	90.30	10.82	110.00	13.22	129.00	15.47
Lytron 680	484.00	57.00	446.00	52.60	410.00	48.40	374.00	44.00	338.00	39.80
Totals	1078.98	100.00	1109.78	100.00	1140.07	100.00	1172.60	100.00	1203.04	100.00
Total Solids	571.58	39.50	602.38	39.50	642.87	39.50	665.20	39.50	695.44	39.50
Total Pigment	234.08	11.90	382.38	13.85	429.87	15.80	478.70	17.80	526.14	19.75

Table IV. Modified Paints—Various pigment volume concentrations in russet.

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	8	8	8	8	8	8	8	8	8
Chalking	9	7	9	7	9	7	9	7	9	6.5
Color Retention	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good

Table IVA. Chalking and dirt collection in ASTM ratings.

placement for part of the vehicle solids in the russet paints. The preparation of these modifying emulsions is indicated in Table VI where it will be noted that the oil used was bodied linseed oil and the alkyd resin used was one of the long oil 100 per cent solid resins which most manufacturers have been producing for latex modification primarily for interior use.

There seems to be no difficulty in preparing these emulsions as indicated in Table VI. It will be noted that during the addition of the ammoniacal water to the oil or alkyd blend an emulsion forms which is the thick, creamy water-in-oil emulsion. As more ammoniacal water is added the emulsion becomes more and more viscous until at a particular point the emulsion inverts and becomes an oil-in-water type which is thin and easily mixable with this particular latex.

The first series checked was a series in which the modified vehicle was the bodied linseed oil. Three paints were exposed in which the pigment volume concentrations were 35, 40 and 50 per cent and the vehicle in each of these was 63 per cent Lytron 680 and 37 per cent bodied linseed oil by weight.

A fourth member of the series exposed at 35 per cent pigment volume concentration contained 25 per cent vehicle solids as Lytron 680 and 75 per cent vehicle solids as bodied linseed oil. These percentages are by weight in each case.

Material	Pounds	Gallons
Tamol 731 (25%)	16.20	1.95
Hot Water	291.49	34.98
400 CPS Methyl Cellulose	16.19	1.94
Cold Water	498.88	58.79
Sodium Orthophenyl Phenate	20.24	2.43
Totals	834.00	100.00

Alkyd Emulsion

Directions

(1) Blend hot water and tamol solution in the mixing tank with agitator on.
(2) Add Methyl Cellulose and continue agitation until all the powder is evenly dispersed.
(3) Add the cold water and continue agitation until the Methyl Cellulose has dissolved.
(4) Add the Sodium Orthophenyl Phenate slowly and continue agitation until it has dissolved.

Table V. Dispersion Medium

Material	Pounds	Gallons
OKO S-37	410.33	51.31
6% Co Drier	1.98	0.24
6% Mn Drier	1.98	0.21
24% Pb Drier	1.98	0.24
Triton X-100	8.16	0.98
Oleic Acid	7.71	1.09
NH_4OH (28% NH_3)	28.18	3.80
Water	351.01	42.12
Totals	811.00	100.00

Oil Emulsion

← **Table VI**

Material	Pounds	Gallons
Alkyd Resin	417.97	50.66
6% Co Drier	2.01	0.25
6% Mn Drier	2.01	0.21
Triton X-100	8.31	1.00
Oleic Acid	7.86	1.11
NH_4OH (28% NH_3)	28.70	3.87
Water	357.54	42.91
Totals	824.00	100.00

Alkyd Emulsion

Directions for both Emulsions

(1) Blend oil or alkyd with the indicated driers, Triton X-100 and Oleic acid.
(2) Blend NH_4OH with the water.
(3) Add ammoniacal water to oil or alkyd, blend slowly with good agitation.

Table VII.

Oil Modified Paints. Various pigment volume concentrations in russet.

↓

Material	35%		40%		50%		35%	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	183.20	5.28	183.20	5.28	183.20	5.28	183.20	5.28
Brown Iron Oxide	71.20	2.85	71.20	2.85	71.20	2.85	71.20	2.85
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85
Talc	64.80	2.62	112.00	4.85	207.20	8.40	64.80	2.62
TPPP	2.04	0.25	2.33	0.28	3.40	0.37	2.04	0.25
Dispersion Med.	209.90	24.98	209.00	24.98	209.90	24.98	209.90	24.98
Water	85.50	10.27	101.00	12.09	138.50	16.67	99.40	11.95
Lytron 680	281.00	33.15	258.00	30.42	213.00	25.10	111.50	13.15
Oil Emulsion	144.00	17.75	133.00	16.40	109.30	13.50	293.00	36.10
Totals	1102.78	100.00	1131.77	100.00	1195.84	100.00	1096.18	100.00
Total Solids	602.38	39.50	642.87	39.50	695.44	39.50	602.38	39.50
Total Pigment	382.38	13.85	429.87	15.80	526.14	19.75	382.38	13.85
% Modification	37		37		37		75	

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	8	8	8	7	8	7	8
Chalking	9	6	9	6	8	6	7.5	5
Color	Fair +	Fair	Fair +	Fair	Fair +	Fair	Fair	Fair −

Table VIIA. Chalking and dirt collection in ASTM ratings.

Material	35%		40%		50%		35%	
	lbs.	gals.	lbs.	gals.	lbs.	gals.	lbs.	gals.
Rutile TiO_2	183.20	5.28	183.20	5.28	183.20	5.28	183.20	5.28
Brown Iron Oxide	71.20	2.85	71.20	2.85	71.20	2.85	71.20	2.85
Clay	61.14	2.85	61.14	2.85	61.14	2.85	61.14	2.85
Talc	64.80	2.62	112.00	4.85	207.20	8.40	64.80	2.62
TPPP	2.04	0.25	2.33	0.28	3.40	0.37	2.04	0.25
Dispersion Med.	209.90	24.98	209.90	24.98	209.90	24.98	209.90	24.98
Water	87.60	10.52	105.20	12.34	140.75	16.92	103.20	12.60
Lytron 680	281.00	33.15	258.00	30.42	213.00	25.10	111.50	13.15
Alkyd Emulsion	144.00	17.50	133.00	16.15	109.30	13.25	293.00	35.60
Totals	1104.88	100.00	1135.97	100.00	1199.09	100.00	1099.98	100.00
Total Solids	602.38	39.50	642.87	39.50	695.44	39.50	602.38	39.50
Total Pigment	382.38	13.85	429.87	15.80	526.14	19.75	382.38	13.85
% Modification	37		37		37		75	

Table VIII. Alkyd Modified Paints. Various pigment volume concentrations in russet.

Value	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.	12 mo.	24 mo.
Dirt Collection	8	8	8	8	7	8	8	8
Chalking	9	7	9	6	9	6	8	6
Color	Good	Fair	Good	Fair	Fair	Fair −	Fair +	Fair −

Table VIIIA. Chalking and dirt collection in ASTM ratings.

It will be noted that the pigmentation of these paints is identical with that of the corresponding members of the russet series where the vehicle is all Lytron 680. No difficulty was experienced in the preparation of these paints.

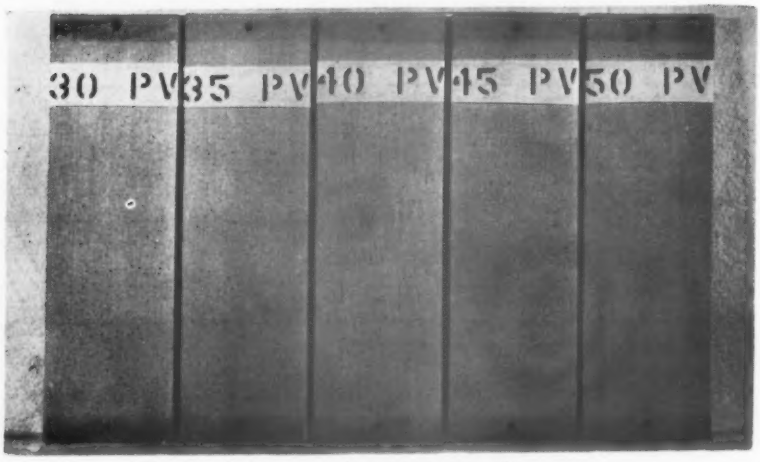
Upon exposure it was noted that there were some characteristics more nearly like those of oil paints, particularly dirt collection, chalking and color retention.

Table VII shows the paints as they were prepared and Table VIIA indicates the exposure rating for the panels at the Santa Clara test station. It will be noted that early dirt collection seems to be greater in the member where pigment volume concentration is high and in the member where oil modification is higher. However, there is a reduction in this dirt collection after 24 months in each case.

Chalking of paints with the smaller amounts of oil modification are practically identical with those for the paints made with all Lytron 680 latex as the vehicle solids. Major variation in results come in color retention. None of these paints equals the color retention of the corresponding paints made with all latex vehicle. But the results are still fully as good as would be experienced with con-

Study of rutile/anatase ratio in percent by weight.

Study of pigment volume concentration—white



Study of pigment volume concentration—gray

ventional oil types of paints.

The last series exposed was one similar to the oil-modification series, except that alkyd was used as the modifying vehicle. The results are similar to those obtained with oil modification except that chalking is slightly less with the alkyd modified paints in each case and color retention is slightly better for the early period of exposure but about the same or slightly poorer at the 24-month point. The results of this series are shown in Table VIII and VIIIA.

Exposure was made on unglazed cement-asbestos shingles, glazed cement-asbestos shingles, cured concrete panels in which a fresh mortar joint was scribed, freshly primed cedar panels and cedar panels upon which an oil-paint system had been exposed until it was chalking freely. The results reported were generally the same for all the panels exposed and no wide variation from this pattern has been noted from any of the exposure stations.

One point of interest which was noted at the Florida station and not at the other stations to date was the tendency of the white with anatase ratios of 50 per cent or better to show some cracking and checking at the two-year point. This cracking and checking at high anatase ratios is assumed to be due to the type of inert chosen. It may be that the particular pattern will be visible in the other experiment stations as the length of exposure increases.

In practice this has not been found to be a problem with the exception of a single horizontal window sill in Ft. Lauderdale, Florida, where a small amount of cracking and checking has been observed after two years of exposure.

Effect of Inerts

The Monsanto laboratories at Springfield are studying the effects of various inerts on high-anatase ratio paints with the expectation that some recommendations will be available in the future. In practice the problem does not seem to be one of a limiting nature because an anatase content of 25 to 40 per cent seems to be all that is practically desirable.

In the Florida series it was noted that paints exposed over freshly primed cedar showed some mildew collection, whereas those exposed over a chalking oil paint system on the same type cedar panels showed no mildew. Nor was mildew evident on the glazed or unglazed shingles or on the cured concrete panels. This was puzzling for some time until the manufacturer of the oil-type primer pointed out that no fungicide had been used in the primer at the

time it was purchased for our use.

This brings up an interesting point regarding the mildewing of latex paints and, incidently, other materials as wlll. This observation is that at least part of the nutrient material used by mildew organisms which discolor paint is furnished by the underlying materials rather than by the paints themselves. This means that if a paint is placed over some substrate which will furnish nutrient materials to mildew organisms there is a strong possibility that the paint will show mildew even though it may itself have no nutrient material available for such growth. Therefore in any exposure series which is put out the fungicidal characteristics of the substrate must be good if the paints are to be kept free from mildew.

Summary

The indications we have received from these exposures can be summarized briefly as follows:

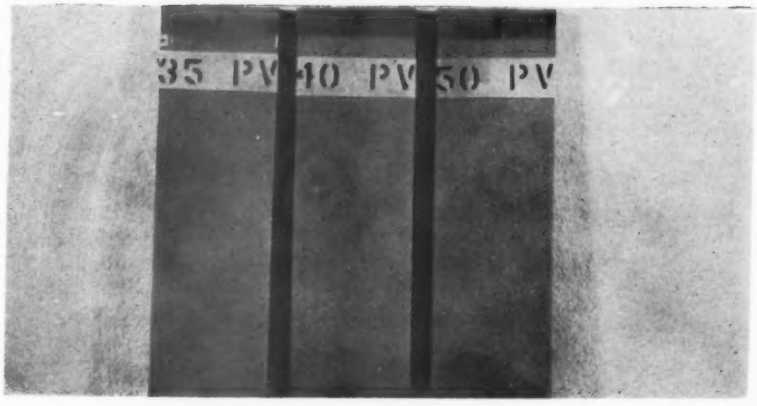
(1) Chalking in Lytron 680 paint is a function of the ratio of non-chalking to chalking pigment which is used in the formulation. The chalking rate at 50 per cent rutile and 50 per cent anatase $TIi0_2$ for a 40 per cent pigment volume concentration paint is approximately equal to that of a standard type oil paint such as TTP-102A.

(2) Variations in pigment volume concentrations from 30 to 50 per cent in white paints, where the hiding pigment is all rutile titanium dioxide, result in completely useful paints over the entire range studied with regard to chalking, dirt collection and protection rating over all the various surfaces tested. Variations in pigment volume concentrations in a gray tint, where the tinting colors are quite light stable and where the hiding white pigment is all rutile titanium dioxide, result in completely useful paints over the entire range from 30 to 50 per cent pigment volume concentration with regard again to chalking, dirt collection, color retention and the protection of the surface painted. In the case of the gray there seems to be practically no variation in color retention from 30 to 50 per cent pigment volume concentration.

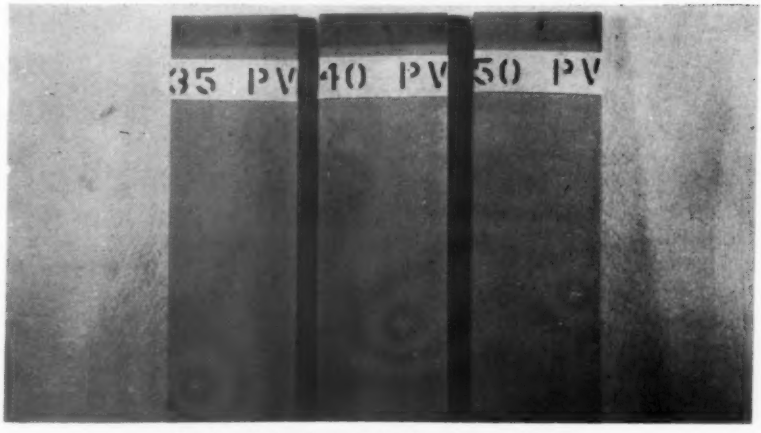
(3) In the case of a russet series, where the titanium dioxide is all rutile but where the tinting color is brown iron oxide which is

(*Turn to page 83*)

Study of pigment volume concentration—russet



Study of oil modification 37 010 bodied linseed oil



Study of alkyd modification long oil alkyd

Dow Latex 566 opens a new era in industrial metal finishing

Latex X-2566 loses its X-2 to become the first latex for new and unique baked industrial finishes

Yes, the X-2 experimental designation has been dropped from Dow Latex X-2566. But something's been added to Dow Latex 566—added production to take care (we hope) of the rocketing demand for this remarkable new latex.

Actually, few of the people who put Dow Latex 566 to the test in customer field trials used the word "remarkable". Dow, they knew, pioneered latexes for latex paints. The first interior flat wall paints of latex that *worked* were made using Dow Latex. And Dow, they knew, supplies most of the latex in paints today. They just seemed to expect that the first latex designed for baked industrial finishes on metal would fly the same banner as the rest of the winners.

Nevertheless, Dow Latex 566 is quite remarkable

Dow Latex 566 is a colloidal dispersion of styrene/butadiene particles in a water system. At last! Here's an industrial finish which is *not* a solution, but a water-dispersed system of latex particles which can have as high a molecular weight as desired without affecting the viscosity of the paint. You see, the molecular weight can be built right into the resin without any concern over its solubility. Here's a water-system industrial finish that practically eliminates fire hazards . . . *completely* eliminates danger from objectionable solvent fumes. And formulators can make a high solids content paint with tough, high-molecular weight copolymer particles.

Speaking of film properties, listen to this: Heat and unique methods of catalysis, by taking advantage of the reactive butadiene groups in the polymer, promote a thermosetting phenomenon with a remarkable upgrading of film properties. Yes, remarkable. You get an exceptionally tough film, good adhesion and durability; one that resists water, chemicals and mineral spirits. And, underfilm rusting is not a problem!

Something wonderful happens when Latex 566 meets iron ions

Back when Latex 566 was new, even to us, some of our men proposed staunchly that the catalysis of a styrene/butadiene copolymer latex could be accomplished on steel through the effect of iron ions at an acid pH. And sure enough, they went ahead and proved it. The iron present is an effective catalyst for double-bond cross-linking at usual baking temperatures. We'll be glad to tell you about the other methods of catalysis that have been developed, but we're especially taken by this one.

Latex 566 shines for automotive and white appliance primers

Applications for metal primers are legion. But the starting point formulations we've tested for automotive and white appliance primers will give you an idea of the wide range of Latex 566 versatility.

For example, in an iron oxide type primer and in an iron oxide/zinc yellow system, we found Latex 566 primers had the following admirable characteristics:

1. *Excellent sprayability*
2. *Excellent adhesion and sandability*
3. *Good enamel hold-out*
4. *Minimum 340 hours salt spray resistance of both primer/enamel and primer system*
5. *Comparable impact resistance to a commercial alkyd-type primer*

The white appliance primer formulation sprayed easily and took a superb white appliance baking enamel after a short flash bake at 140°F. for 10 minutes.

After the enamel bake, the primer came through with:

1. *Excellent adhesion*
2. *Excellent enamel hold-out*
3. *Minimum 1000 hours at 100°F. and 100% relative humidity for both latex primer and latex primer/enamel system*

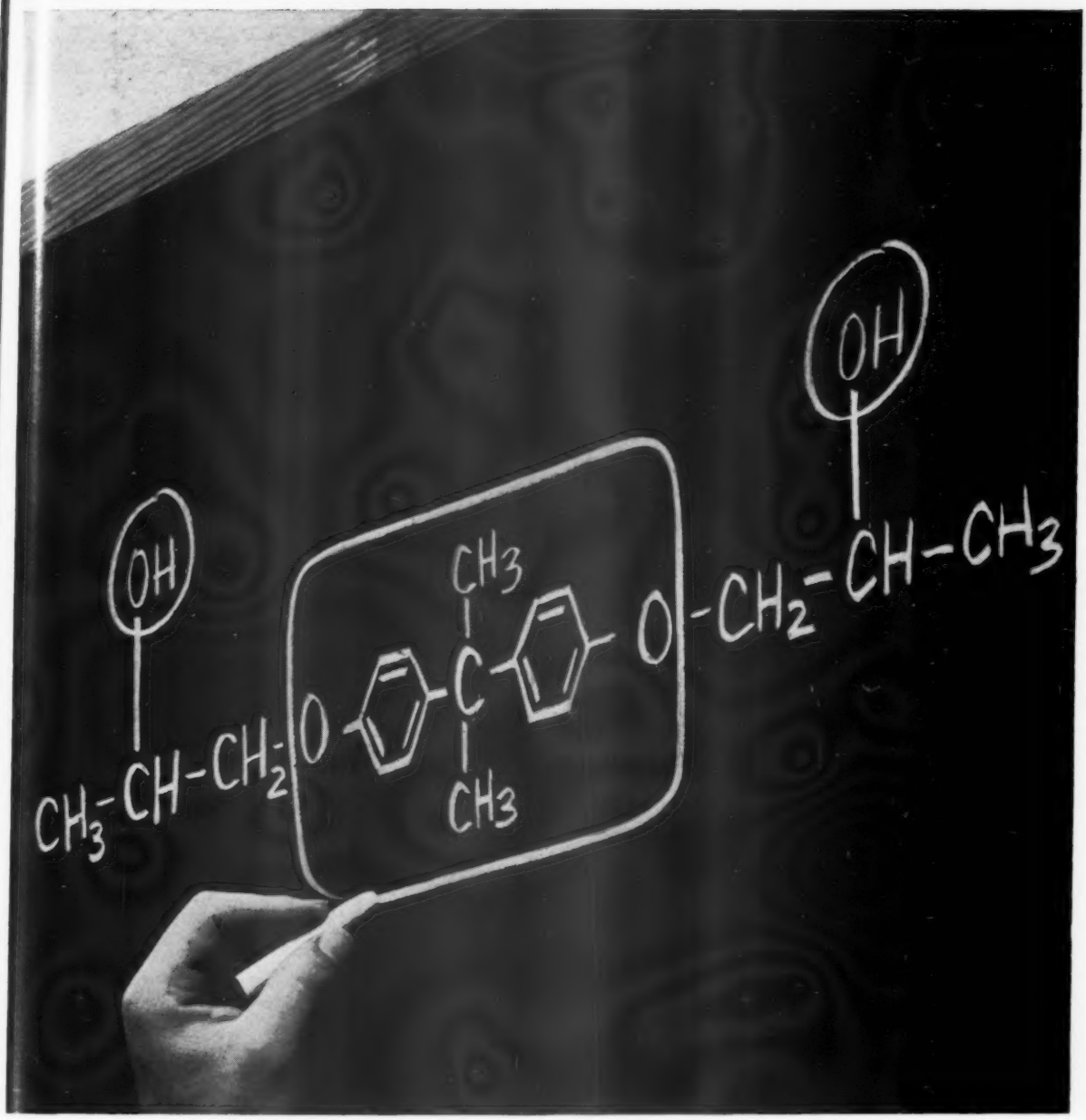
More good news . . . Latex 566 for gloss and semi-gloss bake enamels

Gloss and semi-gloss bake enamels can also be formulated with Dow Latex 566. You'll want to know more about important factors in these formulations . . . such as degree of pigment dispersion and latex-to-pigment ratios.

In fact, why not get all the facts that *we* have about this revolutionary new industrial latex? We think you'll find that Dow Latex 566 can change your whole outlook on the formulation and use of baked industrial finishes. Write to us and ask for the bulletin on Dow Latex 566 (or X-2566 if you still remember it by that name). THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 2120J.

LATEX T.M.

YOU CAN DEPEND ON DOW



Why Dow Resin 565 provides "built-in" improvements for many alkyd finishes

Dow Resin 565 has unique chemical properties. These contribute to the chemical resistance, the exterior durability, and the high gloss of many fine alkyd finishes.

The reason Dow Resin 565 in alkyds offers these outstanding advantages is indicated in the circled portion of the formula shown above. It is derived from bisphenol which appears in many quality vehicles such as the phenolics and epoxies. Dow offers it as an ideal building block for many alkyds. Low color, fine gloss and gloss retention, excellent exterior durability . . . all can be built in with Dow Resin 565.

For details on use of Dow Resin 565 phone or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 2266K-2

YOU CAN DEPEND ON DOW

Dow vinyltoluene delivers low color, high gloss, snap dry with any drying oil

No doubt the most significant advantage of Dow vinyltoluene is its ready ability to modify all commercially important drying oils. With any of them—whether dehydrated castor, linseed, safflower, soya, menhaden, cottonseed, coconut or tall oil—Dow vinyltoluene consistently forms useful, sparkling-clear, high-grade and inexpensive vehicles.

This results in a wide choice of excellent vehicles to upgrade your paints and varnishes at less cost. The vehicles provide an unusual balance of properties, combining low color, high gloss and quick drying with better chemical resistance and durability.

For more information on Dow vinyltoluene, contact our nearest sales office. Or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Dept. 2204B.

YOU CAN DEPEND ON DOW

A Staff Report

PETROCHEMICALS for PAINT

PART II

Basic Chemistry of Petrochemicals (continued)

Methane as a Raw Material

It is perhaps entirely appropriate that the simplest organic compound, methane, (CH_4) is also the basis for the largest tonnage of petrochemicals produced in this country. There are several processes for converting methane into other valuable petrochemical materials. The most important, from a tonnage point of view, is the so-called reforming process in which methane is converted into a mixture of carbon monoxide, CO, and hydrogen, H_2—a mixture known as "synthesis gas." The transformation is accomplished by reacting the methane with steam and oxygen (or air) according to the following equation:

$$3CH_4 + H_2O + O_2 \longrightarrow 3CO + 7H_2$$

Synthesis gas is the basis for the production of ammonia which is, by a large margin, the highest tonnage petrochemical produced. Ammonia, like the aromatic hydrocarbons, is also a by-product of the coking industry. Petrochemical production of ammonia, however, is much more economical for which reason approximately three-fourths of the ammonia produced in this country will soon be produced from methane. The conversion of synthesis gas to ammonia involves the removal of the CO and the interaction of the hydrogen with nitrogen from the air at high temperatures and pressures in the presence of a catalyst.

$$3H_2 + N_2 \longrightarrow 2NH_3$$

Ammonia and products prepared from it do not find large applications in the protective coatings industry. The urea and melamine resins are, of course, based on ammonia as a source of nitrogen. In 1955 five per cent of the 800 million pounds of resin used by the paint industry were ureas and melamines.

Ammonia is also the basis for the alkylene diamines such as ethylene diamine and diethylene triamine which are used to cure the epoxy resins in order to produce high grade coatings. Ammonia is important for the conversion of phthalic anhydride to phthalonitrile, the starting material for phthalocyanine pigments. Certain anti-skinning agents and small percentage additives to paints are nitrogen-containing and thus trace their origin to ammonia. Thus, it may be seen that ammonia, the most important petrochemical produced today from the volume point of view, does not make important *volume* contributions to the paint industry. On the other hand, the importance of ammonia-based products such as the urea and melamine resins for high-grade baking fin-

ishes, the cured epoxy resins and phthalocyanine pigments, hardly requires discussion.

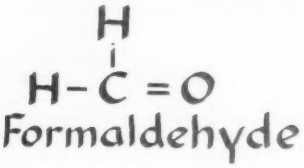
Another product for which methane forms the base is methanol or methyl alcohol. Synthesis gas can be converted into methyl alcohol according to the following equation:

$$CO + 2H_2 \longrightarrow CH_3OH$$

Actually, certain facilities for producing ammonia may also be used interchangeably for the production of methyl alcohol. Synthetic methyl alcohol is produced today to the extent of 1.5 billion pounds per year by such companies as Du Pont, Union Carbide, Commercial Solvents and Allied Chemical and Dye.

Methanol, as such, finds only small usage in the paint industry in certain solvent combinations and as a raw material for certain methyl esters and for methyl cellosolve used in lacquer solvents.

As the starting material for the production of formaldehyde, methanol makes an important contribution to the protective coatings industry. Actually, of all of the methanol produced, approximately 40 per cent is used for formaldehyde manufacture. It must be pointed out, however, that methanol is not the only source of formaldehyde since this important chemical may also be obtained directly from the oxidation of the higher hydrocarbons such as propane and butane. Formaldehyde, which has the following structure, contributes to many products of value to



Formaldehyde

the paint industry. As already indicated above, polyhydric alcohols such as pentaerythritol are based on the condensation of formaldehyde with acetaldehyde. The phenolic resins are condensates of phenols and substituted phenols with formaldehyde. The melamine and urea resins are condensation products, as the names indicate, of melamine and urea with formaldehyde. Thus, it may be seen that a group of chemicals of considerable tonnage importance depend upon formaldehyde.

Methane may be chlorinated to obtain carbon tetrachloride, chloroform, methylene chloride, and methyl chloride. The first three of these are useful as paint removers. Also, they find application as solvents.

When methane is reacted with ammonia, hydrogen cyanide, HCN, results. This important chemical is the basis for the manufacture of acrylonitrile by combining it either with acetylene or with ethylene oxide according to the following equations:

$$HC\equiv CH + HC\equiv N \longrightarrow \underset{\text{Acrylonitrile}}{CH_2=CH-C\equiv N}$$

$$\underset{\diagdown\,O\,\diagup}{CH_2-CH_2} + HC\equiv N \longrightarrow CH_2OH-CH_2C\equiv N \longrightarrow \underset{\text{Acrylonitrile}}{CH_2=CH-C\equiv N}$$

Acrylonitrile has many chemical uses among which is its copolymerization with other unsaturated hydrocarbons, such as butadiene, to give synthetic rubber latices. Some of these may be used as vehicles for emulsion paints.

Hydrocyanic acid is an important chemical in the production of the acrylic resins. Thus, the interaction of acetaldehyde with HCN provides an intermediate which may be dehydrated and hydrolyzed to acrylic acid according to the following equations.

$$\underset{\text{Acetaldehyde}}{CH_3CHO} + HC\equiv N \longrightarrow CH_3-\underset{OH}{CH}-C\equiv N \xrightarrow{-H_2O} \underset{\text{Acrylic acid}}{CH_2=CH-COOH}$$

If acetone is substituted for acetaldehyde, methacrylic acid results according to the following equations.

$$\underset{\text{Acetone}}{\begin{matrix}CH_3\\ \diagdown\\ C=O\\ \diagup\\ CH_3\end{matrix}} + HCN \longrightarrow \begin{matrix}CH_3\\ \diagdown\\ HO-C-C\equiv N\\ \diagup\\ CH_3\end{matrix} \xrightarrow[\text{and Dehydration}]{-H_2O} \underset{\text{Methacrylic acid}}{\begin{matrix}CH_3\\ |\\ CH_2-C-COOH\end{matrix}}$$

Methyl methacrylate, the ester of methacrylic acid, may be polymerized to obtain the acrylic emulsions which currently are being used for high-grade water emulsion paints.

Synthesis gas is also the basis for the so-called oxo process in which an unsaturated hydrocarbon, usually from petroleum sources, is treated with carbon monoxide and hydrogen in the presence of a nickel or cobalt catalyst. The net result is the addition of an aldehyde group to the double bond of the unsaturated hydrocarbon. This aldehyde group may then be reduced to an alcohol or oxidized to an acid. The oxo alcohols used in the preparation of dioctyl phthalate are prepared by this route. Dioctyl phthalate, of course, is one of the most important vinyl plasticizers and is widely used in vinyl plastisol formulations. It is also a plasticizer in lacquer formulations.

The oxo process also provides a route to acids which may be used for driers as illustrated by the following equation.

$$RCH=CH_2 \xrightarrow[CO]{H_2} \begin{matrix}H\\ |\\ R-C-CH_3\\ |\\ CHO\end{matrix} \longrightarrow \begin{matrix}H\\ |\\ R-C-CH_3\\ |\\ COOH\end{matrix}$$

Ethane as a Raw Material

Ethane is important to the petrochemicals industry because it is a source of ethylene. The interrelationship of these two chemicals is shown by the following equation.

$$\underset{\text{Ethane}}{\begin{matrix}H&H\\ |&|\\ H-C-C-H\\ |&|\\ H&H\end{matrix}} \longrightarrow \underset{\text{Ethylene}}{\begin{matrix}H&H\\ |&|\\ H-C=C-H\end{matrix}} + H_2$$

The operation which converts ethane into ethylene is cracking. Competetive processes, all petrochemical, for obtaining ethylene include the cracking of gas oil and the recovery of ethylene from refinery gasses. Currently, 3.6 billion pounds per year of ethylene are being produced.

One very important chemical made from ethylene is ethylene oxide, either by the chlorohydrin process or by direct catalytic oxidation. The latter can be

den onstrated by the following equation:

$$2\,CH_2{=}CH_2 + O_2 \longrightarrow 2\,CH_2{-}CH_2 \quad (O)$$

Ethylene oxide

The chlorohydrin process is indicated by the following reaction:

$$CH_2{=}CH_2 + HOCl \longrightarrow \underset{\substack{OH\\ }}{CH_2}{-}\underset{\substack{Cl\\ }}{CH_2} \xrightarrow{NaOH} CH_2{-}CH_2 \quad (O) + H_2O + NaCl$$

Ethylene oxide may be polymerized to provide the polyethylene glycols which are used as additives for water-based paints. The polymerization of ethylene oxide to polyethylene glycol may be indicated as follows:

$$n\,CH_2{-}CH_2 \quad (O) \longrightarrow -\left(CH_2{-}CH_2{-}O\right)_n-$$

The bulk of the ethylene oxide produced is converted to ethylene glycol which provides the base for the permanent type of antifreeze. Ethylene glycol, however, is also used in alkyd resin manufacture together with glycerol, particularly where the high functionality inherent in short oil alkyds makes desirable a lesser functionality in the polyhydric alcohol portion of the alkyd. "Dacron" or "Mylar" are forms of a polyester resin prepared by interacting terephthalic acid with ethylene glycol. Ethylene glycol with unsaturated dibasic acids provides polyesters which are vehicles for solventless varnishes.

A second very important chemical made from ethylene is the resin, polyethylene. Most of the polyethylene produced finds use as a film for packaging and other purposes. Low molecular weight polyethylenes, however, are soluble in organic solvents and are used as paper coatings. Chlorosulfonated polyethylene is known as "Hypalon", an interesting rubber-like resin, which is finding application in maintenance coatings, particularly where resistance to ozone is required.

Ethyl alcohol or ethanol is a chemical produced in huge tonnage by the hydration of ethylene. Ethanol, as such, is used as a solvent for shellac. It may also be oxidized to acetaldehyde in much the same fashion as methyl alcohol is oxidized to formaldehyde.

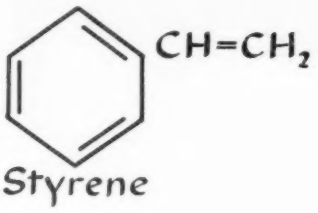
$$CH_3{-}CH_2OH \longrightarrow CH_3{-}CHO$$

Ethyl Alcohol — Acetaldehyde

Acetaldehyde, as already indicated, can be interacted with formaldehyde to provide pentaerythritol. Acetaldehyde is also the basis for producing acetic anhydride.

Acetic anhydride, in turn, is useful for acetylating cellulose. Cellulose acetate is the base for certain high grade lacquers. Its closely related analog, cellulose acetate-butyrate, provides the basis for specialty coatings, particularly of the hot-dip variety.

Of great importance to the protective coatings industry is the chemical, styrene, which has the following structure:



Styrene

Styrene production in the United States in 1956 amounted to 630 million pounds. One of the important uses for ethylene is for conversion to styrene by reaction with benzene.

Styrene, of course, was the compound which, when copolymerized with butadiene in the presence of sodium, provided the important synthetic rubber of World War II, Buna S. Compounds related to this synthetic rubber are the vehicles for the emulsion paints which certainly are one of the most important innovations of all times in the paint industry.

Styrene is also used with polyester resins where it acts as a solvent which, in the presence of peroxide catalyst, copolymerized with the unsaturated polyester. Polyesters are of interest to the protective coatings industry, particularly for the formulation of the so-called solventless varnishes.

The chlorination of ethylene leads to ethylene dichloride and indirectly to vinyl chloride, two compounds which have the following structure:

$$\underset{\substack{Cl\\ }}{CH_2}{-}\underset{\substack{Cl\\ }}{CH_2} \qquad CH_2{=}CHCl$$

Ethylene dichloride — Vinyl chloride

Ethylene dichloride is a potent solvent which finds some use in specialty coatings. With ethyl chloride, it is used to manufacture lead tetraethyl. It also may be used as a paint remover. Vinyl chloride, on the other hand, is the basis for polyvinyl chloride, an important vehicle for corrosion resistant coatings.

Vinyl chloride is prepared from ethylene by chlorinating to obtain ethylene dichloride and then cracking this product to obtain vinyl chloride and HCl according to the following equation:

$$CH_2Cl{-}CH_2Cl \longrightarrow CH_2{=}CHCl + HCl$$

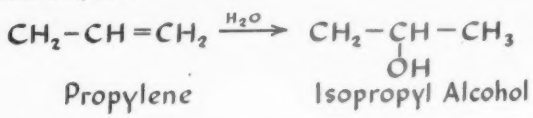
The alternative method for vinyl chloride production is via the addition of hydrochloric acid to acetylene.

Propane as a Raw Material

Propane is usually found mixed with butane in so-called liquid petroleum gas (LPG). When liquid petroleum gas is oxidized, a variety of chemicals are produced including formaldehyde, acetaldehyde, acetic acid and propyl alcohol.

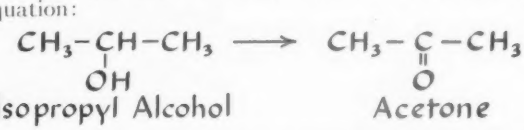
Propane may be dehydrogenated to propylene in much the same fashion as ethylene is produced from ethane. When propylene is hydrated, it produces ispropyl alcohol according to the following equation

which is analogous to the production of ethyl alcohol from ethylene.

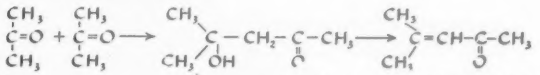


Isopropyl alcohol can be converted into certain esters such as isopropyl acetate which find usage as solvents for lacquers. The other starting material for an ester like isopropyl acetate is, of course, acetic acid, one source of which is the above mentioned oxidation of a mixture of propane and butane.

Isopropyl alcohol may be converted by dehydrogenation into acetone as indicated in the following equation:

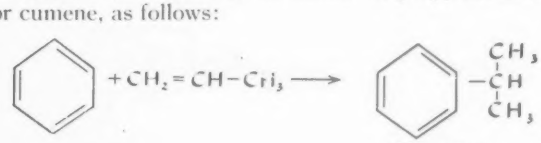


Acetone also is a solvent for lacquers and is the basis for the preparation of diacetone alcohol and mesityl oxide which find some use as higher boiling lacquer solvents. The equations for the preparation of these two materials follow.

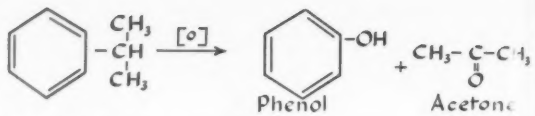


Reference has been made several times already to synthetic glycerol which uses propylene as a raw material. Propylene is also the basis for allyl chloride which is obtained by direct chlorination. Allyl chloride, in turn, may be converted to epichlorohydrin which is the first step in the preparation of the epoxy resins. Hydrolysis of epichlorohydrin yields glycerol. The chemistry of these materials will be discussed in detail later. Suffice it to say, the production of synthetic glycerol represents a great achievement by American chemical industry. At the same time, the introduction of the epoxy resin represents another extremely important milestone for the paint industry. Neither of these advancements would have been possible had propylene not been available from the petrochemicals industry.

The importance of phenol to the protective coatings industry, particularly as a base for phenolic resins and, more recently, as one of the starting materials for the epoxy resins, has been mentioned several times. There are several procedures for preparing phenol and, as indicated above, it is available directly from the coking industry. The newest process for phenol preparation is the so-called cumene process which is based on propylene. In this operation, propylene is reacted with benzene to obtain isopropylbenzene or cumene, as follows:



When cumene is oxidized, acetone and phenol result according to the following equation:

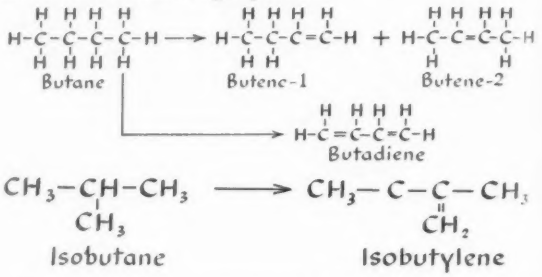


This method has proved to be an attractive one for phenol preparation.

Of interest is the nitration of propane itself to obtain a variety of nitrated paraffins including nitromethane, nitroethane and nitropropane. These are used to some extent as solvents for protective coatings.

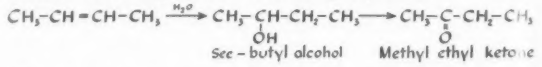
Butane as a Raw Material

The presence of butane and isobutane in liquid petroleum gas has been mentioned in the preceding section. The dehydrogenation of butane yields butylene which is a mixture of butene-1 and butene-2. Further dehydrogenation yields the doubly unsaturated butadiene. Dehydrogenation of isobutane yields isobutylene. These transformations are indicated in the following equation.



There are four procedures for synthesizing butadience. One of these is by the catalytic dehydrogenation of the butylenes. The second is by the catalytic dehydrogenation of butane itself and a third is from ethyl alcohol by combining catalytic dehydrogenation with dehydration. This method is normally not competitive. A fourth procedure is to obtain butadiene as a by-product in low yield from the very high temperature cracking of liquid hydrocarbons for the express purpose of producing unsaturates.

Butylene is the basis for secondary butyl alcohol which, in turn, may be converted into methyl ethyl ketone according to the following equations.



Butylene is prepared not only from butane by dehydrogenation but also some of it is obtained from refinery gasses.

Isobuty alcohol as such and in the form of its ester, isobutyl acetate, and methyl ethyl ketone are important solvents for lacquers and paints. As a matter of fact, the lacquer industry was made possible because of the availability of solvents such as butyl acetate. In all fairness, however, it must be pointed out that the fermentation industry was the original source of the butyl alcohol consumed by the lacquer industry.

The polymerization of butylene or isobutylene leads to the so-called polybutenes (polybutylenes) or polyisobutylenes, depending on which isomer is used as the starting material. The polybutenes provide a

(Turn to page 82)

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CSC NITROPARAFFINS as solvents in VINYL COATINGS offer 5 important advantages!

1. *Lower Viscosity!*
2. *Higher Solids!*
3. *Slower Evaporation Rate and Better Flow!*
4. *Less Solvent Retention!*
5. *Reduced Odor Problems!*

Studies at CSC's Lacquer Laboratories show that 2-Nitropropane and Nitromethane outperform the ketones in the preparation of vinyl spray formulations. Formulators can now take fullest advantage of the superiority of CSC Nitroparaffins in producing high-quality vinyl coatings.

High solids vinyl formulations prepared with 2-Nitropropane have good stability and show no tendency to gel during storage. 2-NP resin solutions are considerably lower in viscosity than mixtures based on medium-boiling ketones, allowing higher weights of solids in a given volume of lacquer and thus greater surface coverage.

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Pittsburgh • Richmond • St. Louis • San Francisco • IN CANADA: McArthur Chemical Co., Montreal
IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.

AUTOMOTIVE LACQUERS based on HALF-SECOND BUTYRATE

Eastman Chemical Products, Inc., reports that a half-second butyrate, pigmented lacquer has completed nine months of outdoor weathering in Florida, showing outstanding weathering durability compared with conventional lacquers in use today.

The period of exposure included the months from February through September. Although the panel used has a curved surface which prevents the recording of gloss values, Figure 1 shows the differences in specular gloss between nine different coating systems.

The areas in Figure 1 are identified as follows:

A — A commercial automotive acrylic lacquer applied over the recommended primer.

B — A commercial automotive cellulose nitrate lacquer applied over the recommended primer.

C — A commercial automotive enamel applied over the recommended primer.

D — Half-second butyrate lacquer X-1531-39-2 applied over primer PS-15-1.

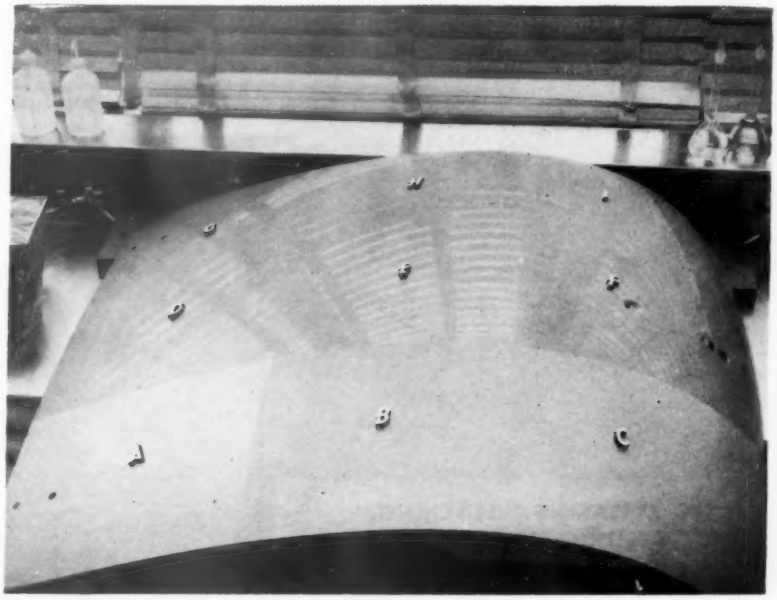


Figure 1.

E — Half-second butyrate lacquer BS-19-1 applied over primer PS-15-1.

F — Half-second butyrate lacquer X-2734-70-18 applied over primer PS-15-1.

G — Half-second butyrate lacquer X-1531-39-2 applied over primer X-2734-80-7.

H — Half-second butyrate lacquer BS-19-1 applied over primer X-2734-80-7.

I — Half-second butyrate lacquer X-2734-70-18 applied over primer X-2734-80-7.

(*Turn to page 77*)

Three Years o

NO STREAKING, BLEACHING, OR PEELING:

The stucco exterior of this west coast home was painted with a BAKELITE Brand WC-130 based paint over three years ago. Despite heavy rains and semi-tropical heat, no streaking, bleaching, or other sign of failure is evident. *Look at the close-up* of a small section of the stucco surface. The paint is obviously in "just-applied" condition.

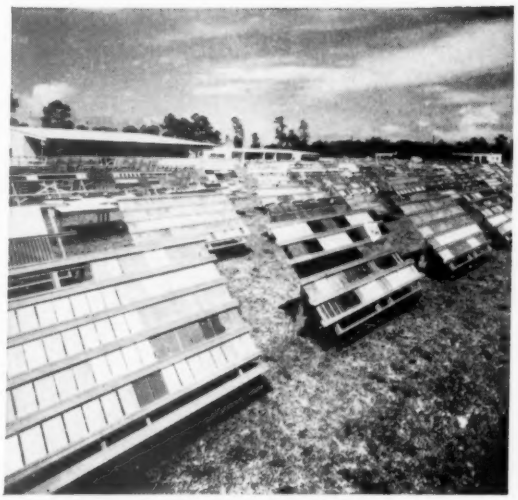
Exposure Testing Prove . . .

Excellent Performance of Exterior Paints made with Bakelite WC-130 Vinyl Latex

The proof is in the performance . . . and the performance is excellent! It's proof resulting from more than five years of thorough research. Laboratory analysis, test panel results under climatic extremes, and on-the-job home decoration . . . these are your assurance of the distinct advantages of high-quality *exterior* paints based on BAKELITE WC-130 Vinyl Latex.

This is important news for formulators! Paints based on WC-130 are easier to apply, and therefore easier for you to sell. You and your customers get the profitable benefits of excellent ultra-violet light stability, alkali and water resistance, good pigment-binding ability and package stability. Plus: uniformity of appearance, full depth of color, and flexibility of formulation to cope with conditions of high humidity, heat, cold, or weathering.

Use BAKELITE WC-130 yourself. You will be pleased to find how economically exterior paints can be formulated with WC-130 as the base. This latex, polymerized under proper conditions of temperature and pH, gives a smooth and stable emulsion which assures a uniform film with a noticeable absence of foaming. BAKELITE Brand WC-130 is a proven latex that assures the development of finished formulations for quality emulsion paints. Talk with your Bakelite Company representative. He'll give you the complete quality story and supply you with samples for testing. Or use the coupon below. Remember — uniformity assures customer satisfaction time and time again.



EXTENSIVE FIELD TESTING IN EXTREME COLD AND SEMI-TROPIC CLIMATES

These test panels which have been exposed to wind, rain, cold and sun have demonstrated the ability of paints based on BAKELITE Brand WC-130 Vinyl Latex to look better and last longer.

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Gentlemen:

☐ Please send me the complete quality story on WC-130 for Exterior Paints.

☐ I would like samples for testing.

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Southern Club Meeting in Atlanta, March 19-22

The Southern Paint and Varnish Production Club will hold its annual meeting at the Atlanta Biltmore Hotel, Atlanta, Ga. on March 19-22, 1958. An important feature of this annual meeting is the Raw Material and Machinery Exhibit. The program is as follows:

WED., MARCH 19

10:00 A.M. Registration Opens
2:00 P.M. Exhibits Open
5:00 P.M. Registration and Exhibits Close

THURS., MARCH 20

8:30 A.M. Registration and Exhibits Open
10:00 A.M. Meeting Opens
10:45 A.M. Pigmentation of Flat Paints, Part II, F. A. Lilley, Du Pont Co.
11:20 A.M. Self-Sanitizing Paints, Dr. Paul Klens, Nuodex Co.
2:30 P.M. Gloss Retaining, Fast-Drying Industrial Finishes, Frank E. Piech, Hercules Powder Co.
3:15 P.M. Industrial Application of Water-Thinned Paints, M. C. Carpenter, Dow Chemical Co.
5:00 P.M. Exhibits Close

FRI., MARCH 21

8:30 A.M. Exhibits Open
9:30 A.M. Business Meeting
10:45 A.M. Address by J. F. Battley, Pres. of NPVLA
11:00 A.M. Gulf Coast Area Exposure Studies of House Paints, Southern Club Paper by R. W. Ashley
Dispersion Tests of High Speed Impelled Equipment, Southern Club Paper by S. Guggenheim
Survey of Uses for Color Difference Meter, Southern Club Paper by Thomas Greer
2:30 P.M. Open Forum—"Col." Billy Hood
5:00 P.M. Exhibits Close
7:30 P.M. Banquet and Dance

EXHIBITORS

EXHIBITORS	BOOTH NO.
Paul O. Abbe Little Falls, New Jersey	10
Advance Solvents & Chemical Co. New Brunswick, New Jersey	51
Archer-Daniels-Midland Co. Minneapolis, Minnesota	1
Bakelite Co. New York, New York	22
Baker Castor Oil Co. Bayonne, New Jersey	16
Buckman Laboratories, Inc. Memphis, Tennessee	4 & 5
Charles L. Burks Co. East Point, Georgia	50
Celanese Corporation of America New York, New York	7 & 8
Colton Chemical Co. Cleveland, Ohio	12
Dewey & Almy Chemical Co. Cambridge, Massachusetts	34
Dow Chemical Co. Midland, Michigan	14 & 15
Goodyear Tire & Rubber Co. Akron, Ohio	19 & 20
Hercules Powder Co. Wilmington, Delaware	25
Herman Hockmeyer & Co. New York, New York	46
R. T. Hopkins Co. Atlanta, Georgia	45
International Talc Co. New York, New York	47
Spencer Kellogg and Son, Inc. Buffalo, New York	35
Kinetic Dispersion Corp. Buffalo, New York	24
Metals Disintegrating Co., Inc. Elizabeth, New Jersey	23
Mineral Pigments Corp. Muirkirk, Maryland	11
Morehouse-Cowles, Inc. Los Angeles, California	43 & 44
Naftone, Inc. New York, New York	6
Nuodex Products Co. Elizabeth, New Jersey	42
A. J. Passonno Co. Tampa, Florida	48
Pennsylvania Ind. Chemical Corp. Clairton, Pennsylvania	31 & 32
Raybo Chemical Co. Huntington, West Virginia	9
Reichhold Chemicals, Inc. White Plains, New York	21
Charles Ross & Son Co. Brooklyn, New York	3
Shell Chemical Corp. New York, New York	36 & 37
Standard Press Atlanta, Georgia	2
Troy Chemical Co. Newark, New Jersey	49
Union Carbide & Carbon Chemicals New York, New York	27 & 28
Vulcan Steel Container Co. Birmingham, Alabama	17 & 18
Witco Chemical Co. New York, New York	13

NEWS

DuPont Adds to Program of Grants to Education

Nearly $1,150,000 has been awarded in grants to 135 universities and colleges in the E. I. du Pont de Nemours & Co. program of aid to education during the current school year, the company has announced, and approximately $100,000 more has been earmarked by the company for the next academic year.

The firm announced that most of the increase and more than half of the entire program is for strengthening the education of scientists and engineers. Grants for fundamental research are also being continued, as are grants for fellowships, which once made up the entire program.

For the first time since the program began in 1918, grants are being made to medical schools for the advancement of teaching. Such grants proved effective in science, mathematics and liberal arts.

Components of the program include $664,000 in grants for teaching to more than 100 privately controlled colleges and universities, including 12 medical schools; $309,000 in aid for fundamental research, including $15,000 each to ten universities and $10,000 each to ten others for fundamental research, of their own choosing in chemistry, and $1,500 each to 26 universities for summer research of staff members; and $155,000 for 40 fellowships in science and engineering to be shared by 25 universities.

Grants for other university work round out the total program.

•

Miss Clarkson Elected

Elizabeth Clarkson has been elected president of the Wet Ground Mica Assoc., Inc., it has been announced.

Miss Clarkson, vice president of Stewart N. Clarkson Associates, Inc., an association management firm, has served as secretary-treasurer of the Wet Ground Mica Assoc. for the past ten years.

Arizona Chemical Runs Contest in Ad Series

Arizona Chemical Co. has invited its customers to enter a contest that will provide the theme for its 1958 advertising and promotion campaign.

C. W. Kohlman (left), advertising manager, goes over details of the new Arizona Chemical Co. contest with the late A. Scharwachter (right), executive vice president, and Henry Zeni, sales manager. Prize for winning entries is a barrel of any of the firm's tall oil products or cash.

The campaign "kicked off" last month with contest announcements in magazines covering a cross section of the chemical industry. The first ad in the series invited readers to furnish interesting examples of how they are using the company's products in new and effective ways.

Winning entires, those used in the firm's advertising program, earn 55-gallon drums of any one of the company's "Acintol" tall oil products, or the equivalent in cash.

The series is designed to establish the wide variety of uses for Arizona's tall oil products, translating in full page ads the customers' own ideas through situation drawings and captions.

According to C. W. Kohlman, advertising manager, the idea stems from the fact that the decision to evaluate the use of tall oil may come from almost any level in any company. The aim of the informal format is to establish a chatty man-to-man approach, which should build a steady readership.

The benefits Arizona products offer are to be spelled out in a semi-technical manner.

L.A. Do-It-Yourself Show

Discussions and demonstrations of painting technique are to be a part of the Los Angeles Do-It-Yourself Show to be held at the Pan Pacific Auditorium, March 20-30.

Paints are to compete with other wall and floor covering techniques which are to be stressed at the show and in all its publicity.

The late March date of the show has been selected in order to capitalize on the opening of the home-improvement market at that time each year. Theme of the show is "Springtime is Fix-up Time."

Colton Expands Facilities

Expansion of production facilities has been completed at the Cleveland plant of Colton Chemical Co., according to an announcement by Bernard R. Krashin, president.

Increased plant capacities provide for the manufacture of Flexbond copolymer emulsions for the paint industry. The emulsions were previously made at the firm's Elkton, Md., plant.

Facilities at Elkton are being extended to make possible increased production of Vinac emulsions, it has also been announced.

NEWS

Filter Export Firm Formed

Olin Mathieson Chemical Corp. and Cuno Engineering Corp. have announced their association in a jointly-owned company for the manufacture and sale of Micro-Klean filters abroad.

The new firm is to be called Olin Cuno Filter Corp., U. S. A. Several manufacturing sites are being studied, and one is to be chosen within the next two months, according to a joint announcement by the presidents of the two parent firms.

An independent sales and distribution unit is to be established in Europe, according to the announcement. Olin Mathieson, through its Winchester International Division, has for the past year been acting as export representative for Cuno in all areas outside of the United States and Canada.

•

Rheem in Foreign Pacts

Rheem Mfg. Co. has completed arrangements for making and selling Rheem products in Belgium and Canada, it has been announced.

In the Canadian venture, a newly-formed subsidiary sales agency in Toronto, Rheem-International, Ltd., will conduct sales under an agreement with Rheem-Canada, Ltd., manufacturing affiliate in Hamilton, Ont.

The Belgian agreement licenses Travail Mecanique de la Tole, Brussels metal fabricating firm, to make and sell Rheem water heaters and interior drum linings. The agreement extends the market for the products to Belgium, the Belgian Congo, The Netherlands, Luxembourg and eventually other European Common Market countries.

•

New Office Quarters

Ferro Chemical Corp. has announced the completion of a sales and administration building at Bedford, Ohio.

The "Californian" style office building was constructed at a cost of $100,000.

ILMENITE MINE: "Traveling lake" near Starke, Fla., where E. I. du Pont de Nemours & Co., Inc., has taken over ilmenite mining operations. The black sandy ore is mined as raw material for titanium dioxide. Floating dredge (right foreground) digs sand and pumps it to the "wet mill" (background) where black ilmenite is separated from the sand. The mine formerly had been operated for Du Pont by Humphreys Gold Corp.

Leasing of Equipment to Rise, Study Reveals

Many paint, varnish and lacquer firms will be operating their plants with leased equipment within the next ten years, according to William R. Heins, in a study for the Foundation for Management Research.

Mr. Heins is president of United States Leasing Corp. The study is titled, "Leasing and American Industry."

The major advantage of leasing, according to the study, is that it frees working capital for expansion of sales, taking of all trade discounts, building balanced inventories and expanding research and development work.

The study said that leasing will become increasingly important in industries whose ratios of fixed assets to tangible net worth are at least 30 per cent. In the paint, varnish and lacquer industry the ratio is 32 per cent, the study said.

In some cases, the study indicated, manufacturers are selling their plant facilities and equipment, and leasing them back immediately on a purchase—lease-back, in order to convert fixed assets to current assets.

Leasing is said to have three appeals. First, in these days of tight money, a manufacturer does not have to freeze his own capital in equipment. Second, a manufacturer does not have to worry about equipment becoming obsolete. Finally, many firms believe that it is better to lease equipment, which depreciates in value, and own rather than lease real estate, which is relatively stable in value.

At the end of a short-term lease a firm can always secure the newest piece of equipment on another lease, according to Mr. Heins. The leasing corporation handles disposal of the worn equipment. The typical lease today is from three to five years.

Copies of the study are available free from the Foundation for Management Research, Inc., 121 W. Adams St., Chicago 3, Ill.

•

Fatty Acids Division Formed

The Pulp Chemicals Assoc. has formed a fatty acids division to handle the problems of the Association's tall oil fatty acids manufacturers, it has been announced.

According to R. J. Spitz, chairman of the new division, the initial program will feature promotion of greater use of tall oil fatty acids among such industries as protective coatings, plasticizers and floor polishes.

Mr. Spitz, vice president of Newport Industries Co., said that tall oil fatty acids are being produced today at an annual rate of approximately 50,000 tons.

Physical-chemical characterization of polymers by light-scattering

You'll benefit from Du Pont Research

New Laboratory is opened to develop improved nitrocellulose lacquers

You will share in the benefits that develop as a result of lacquer research now under way in Du Pont's newly opened sales development laboratory.

New modern facilities and an expanded staff of lacquer technologists are working on common industry problems. Their goal is better lacquers from better nitrocellulose.

Realize the results of this research yourself by specifying Du Pont Nitrocellulose. With it you are assured an ample supply from expanded production facilities, rapid delivery and a choice of a complete line of wetting agents. Call our nearest branch office or write to E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Chemical Sales, Wilmington 98, Delaware.

DU PONT NITROCELLULOSE DU PONT REG. U.S. PAT. OFF. **Better Things for Better Living . . . through Chemistry**

See the "Du Pont Show of the Month" on CBS

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29.4% of the combined chromate plus extender pigmentation is made up of Celite 266 in Shawinigan Resins Wash Primer formula B1001. In formula B1002, the Celite proportion is 28.3%. For full details write for Brochure on Butvar® and Formvar® in wash primers. Address Shawinigan Resins Corporation, Springfield 1, Massachusetts.
Wash primers that don't settle go on fast and easy.

To assure a soft dispersible cake Shawinigan's formula B1001 calls for Celite diatomite

IN polyvinyl butyral wash primers, Celite's* high bulking action and unique particle structure help control hard packing to assure easy application, stability and good performance. Being inert chemically, Celite also provides non-reactivity and compatibility with wash primer pigments. Irregular microscopic Celite particles also promote adhesion of top coats when they are present in primer formulations.

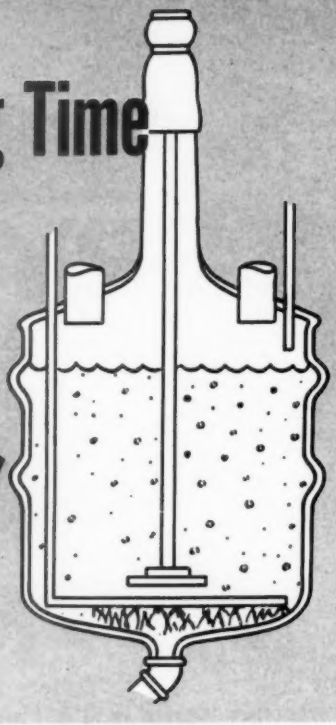
Find out how Celite helps combat hard pigment settling in wash primers. Write for further information to Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JOHNS MANVILLE JM PRODUCTS Johns-Manville CELITE Diatomite Pigments

CO_2 Sparging Cuts Cooking Time by 485 Minutes

PERFECT RESULTS in 1/3 the time



Actual tests conducted in the laboratories of a major manufacturer (name on request) produced these conclusive findings:

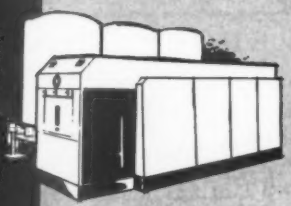
CO_2 sparging, added to conventional mechanical agitation, cuts cooking time from 720 to 235 minutes! To achieve this remarkable saving, CO_2 functioned in 3 important ways—

1. Sparged up through the mixture, CO_2 markedly increased agitation, causing faster, more even cooking.
2. Passing up through the mixture, the CO_2 bubbles absorbed water vapor from the product—allowing the mixture to reach the desired cooking temperature sooner.
3. CO_2, when sparged through the reaction mixture, inerts it—effectively inhibits oxidation—color stays desirably light and constant.

Here are some of the many ways in which CO_2 is helping to do a better job and lower costs.

- Cuts oil cooking time 2/3
- Retards oxidation in thinning tanks and provides fireproof blanket
- Prevents "skinning" in storage
- Safest transfer medium for flammable fluids
- Purges filters, recovers oil, reduces cleaning time and frequency of cleanings
- Prevents flash fires, explosions. CO_2 provides a heavier-than-air "blanket" that displaces oxygen
- Prevents "skinning" and eliminates costly cleanouts of transport containers

LIQUIFLOW CO_2 SYSTEM



Manufactured by Liquid Carbonic. This unit assures a constant supply of chemically pure CO_2 anywhere in your plant. Let experienced LIQUID engineers show you how an integrated Liquiflow CO_2 System will improve your product and lower your operating costs.

World's Largest Producer of

LIQUID CARBONIC

DIVISION OF GENERAL DYNAMICS CORPORATION
Chicago 23, Illinois

FREE BULLETIN

Gives complete details on CO_2 applications in the paint and varnish industry. Send for your copy of "The Use of CO_2 in Paint, Varnish and other Alkyd-Type Resin Manufacturing."

LIQUID CARBONIC
DIVISION OF GENERAL DYNAMICS CORPORATION
3128 South Kedzie Avenue • Chicago 23, Illinois

Please send me your technical bulletin on the uses of CO_2 in the paint and varnish industry.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

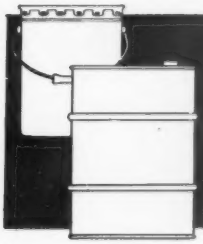
—and Overnight!

- Prompt delivery from our factory in Birmingham and warehouses located in all principal cities.
- Vulcan Steel Container Co., Quality-Steel Pails and Drums engineered for dependable transportation and safe storage of YOUR PRODUCT.
- All types and styles of fittings and closures.
- Hi-Bake Lined—Lithographed—all colors.
- Modern plant methods, manufacturing know-how and scientific testing produce Pails and Drums perfect for packaging YOUR PRODUCT.

Quality Made
Dependable Service
SIZED and STYLED for YOUR PRODUCT

STOCKED WAREHOUSES IN PRINCIPAL CITIES MEAN PROMPT DELIVERY OF VULCAN STEEL CONTAINER CO.'S QUALITY-STEEL PAILS AND DRUMS.

Let us help solve your toughest packaging problem. Write, wire or phone today for prices, samples.



VULCAN STEEL CONTAINER CO.

Main Office and Factory

3315 35th AVE., N. • P. O. BOX 786 • BIRMINGHAM, ALABAMA

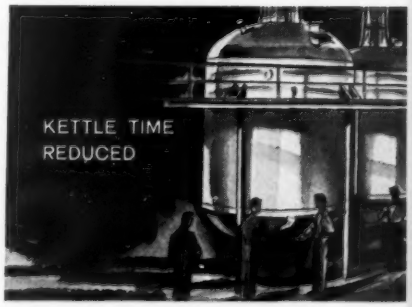
SEE

You're looking at the newest development in TECH GRADE P. E.

Pelletized Pentaerythritol

This new and revolutionary pelletized form for P.E. makes these two important advantages possible. When Celanese P.E. pellets are poured, there's no dust storm . . . there's no P.E. escaping up the stack. It puts an end to the costly and time-consuming interruption of cooking cycles to add more P.E. because the full and required quantity never reached the resin reactor.

If you have signs of P.E. snow on your plant roof, you should investigate the cost-saving possibilities of this new Celanese first — TECH GRADE PENTAERYTHRITOL IN PELLETIZED FORM. Celanese®



Pelletized Pentaerythritol . . . a new Celanese development

CHEMICALS

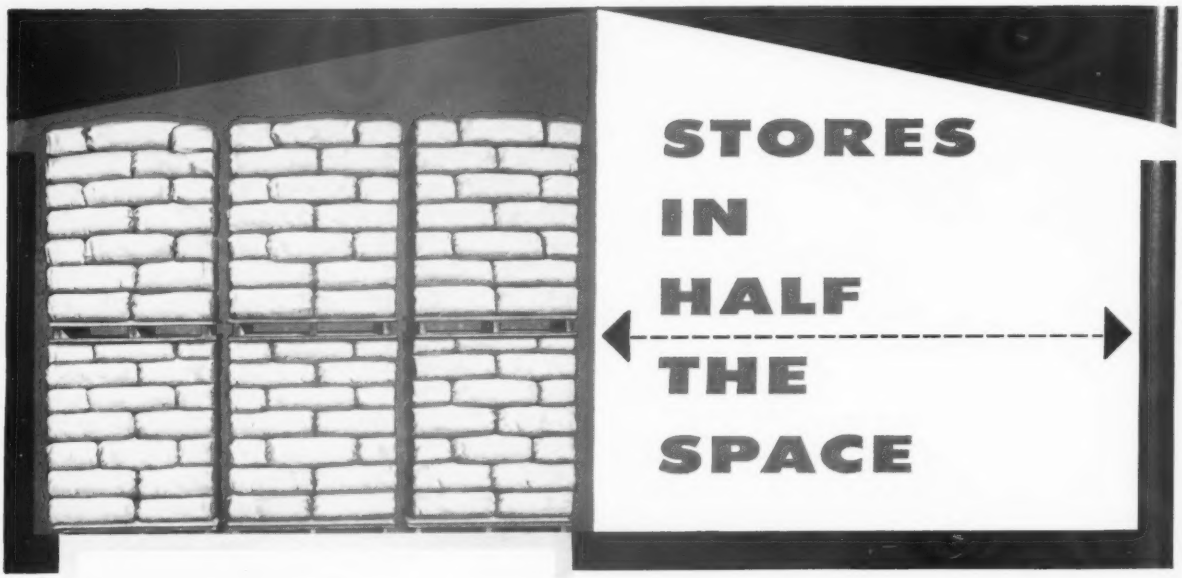
Celanese Corporation of America, Chemical Division, Dept. 558-C, 180 Madison Avenue, New York 16, N. Y.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

SEE CHEMICAL MATERIALS CATALOG AND CHEMICAL WEEK BUYERS' GUIDE FOR COMPLETE LISTING OF CELANESE CHEMICAL PRODUCTS

AZODOX

New, Higher Density Zinc Oxide



HERE ARE OTHER IMPORTANT REASONS WHY AZODOX IS BEST FOR YOU

Increased Mixing Capacity. AZODOX incorporates readily in oil, disperses completely. Its high density, low bulk gives greater capacity, steps up production in both mixers and mills.

Physical Properties Unchanged Except for Density. Consistency, particle size and shape, color and all other physical properties of AZO-ZZZ, American Process, paint grade zinc oxides are unaltered. *Apparent density only is changed.* All chemical properties are unchanged.

Flows More Freely, Less Dusting than conventional zinc oxides.

AZODOX Cuts Your Costs. Faster handling, easier storing, quicker mixing save you money.

Samples and test-lots of factory-proved AZODOX now available for you *at the same price of conventional zinc oxides.*

AZODOX is a revolutionary new form of zinc oxide (de-aerated). With twice the density, half the bulk of conventional oxides, AZODOX is the answer to your storage problem. AZODOX comes to you in an easy-to-handle small package, shaped to permit closely packed, unitized shipments. *And the perfect texture of the material remains unchanged.*

AZODOX is available in all grades of American process lead-free zinc oxide.

American Zinc sales company

Distributors for
AMERICAN ZINC, LEAD & SMELTING COMPANY
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

BAKER-RAULANG

FORK TRUCK
Multi-Purpose Attachment

Fork truck now comes equipped with Multi-Handling attachment designed to economically handle odd and varied-sized cartons in small quantities without time-consuming changing of attachments.

Developed for use in warehouse distribution centers and manufacturing operations. Attachment includes side shifter, lift extender, carton lip, finger lift and pair of hinged forks. Equipment handles ordinary pallet loads, hauls and stacks large cartons, handles extremely high loads and removes highly-stacked heavy loads by unique hinged fork method.

Equipment said to eliminate binding strap breakage because of normal carton lip distortion. Loads and unloads highway trucks or boxcars.

Multi-Handling Attachment is mounted on 2,000-pound chassis with 1,000 pound capacity. Has 24-inch load center, stacks as high as 248 inches.

Baker-Raulang Co., Dept. PVP, 1250 W. 80th St., Cleveland 2, Ohio.

FLASH PT. DETERMINATION
Range of 80° to 180°F

Automatic means for rapid and accurate indication and recording of flash points with range of 80° to 180° F. has been developed.

Of particular interest where quick and permanent ASTM D 56 flash points and operational simplicity are required. Results said not to vary more than two degrees F. from those obtained manually under ASTM D 56, "Flash Point by Tag Closed Cup Tester," provisions.

Accuracies within ± one degree F. obtained in two to four minutes, depending upon flash point. Precision Scientific Co., Dept. PVP, 3737 W. Cortland St., Chicago 47, Ill.

PRECISION

ACRYLATES
Low Inhibitor Grades

Low inhibitor grades of methyl acrylate and ethyl acrylate are now available.

Products, containing 0.02 per cent of inhibitor, are specially designed for polymerization and copolymerization without necessity for inhibitor removal, according to manufacturer. Small amounts of inhibitor in products said to be overcome by use of proper quantity of polymerization catalyst.

Samples on request from Special Products Dept., Rohm & Haas Co., Dept. PVP, Washington Square, Philadelphia 5, Pa.

DIGLYCOL LAURATE
Emulsifier and Anti-foamer

"Sole-Onic CDS," diglycol laurate self-emulsifying type emulsifier and defoamer, has been placed on the market.

The oil-soluble surfactant is for use as emulsifier in water based paints, pigment dispersions, industrial oil products and polishes. Also for use as defoamer in water based paints.

Product is soluble in ethanol, isopropanol, toluol, benzene, mineral oil, naphtha and chlorinated solvents. Dispersible in water. Partially soluble in methanol, ethyl acetate, acetone and saturated aliphatic hydrocarbons.

Sole Chemical Corp., Dept. PVP, 27 E. Monroe St., Chicago 3, Ill.

AIR-POWERED PUMP
Eliminates Contamination

Lightweight, air-powered pump of stainless steel permits minute quantities or volume delivery of fluids directly from original shipping containers.

Pumping of liquids and semi-fluids from two-inch end bung or open head of original drum assures contamination-free supply. Stainless steel lower assembly quickly and easily removed from power

GRAY

NEW MATERIALS — EQUIPMENT

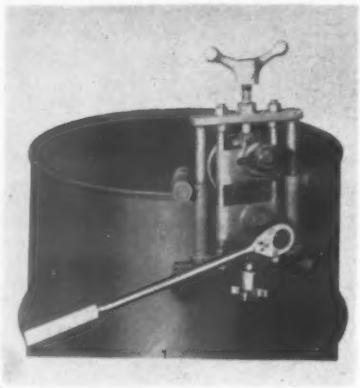
head without use of tools for complete cleaning.

Air-operated power head eliminates danger of sparking and high cost wiring. Said to produce equal delivery on both up and down strokes for smooth, continuous flow, with no pressure on the drum. One man operation.

Gray Co., Inc., Dept. PVP, 1016 Sibley St. N.E., Minneapolis 13, Minn.

DRUM DE-HEADER
Smooths Cut Edges

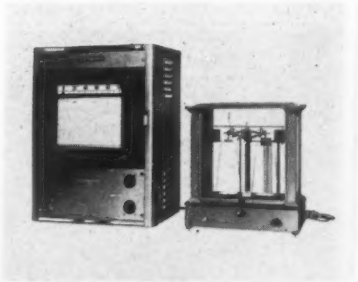
A portable drum de-header has been made available which shears down through the head against inside body of either full or empty drums while smoothing cut edge of metal against body of drum.



GILCO

De-heads drums from 14 to 28½ inches in diameter, with chime ranging from one-quarter to 1½ inches in depth, and of 16 gauge steel and thinner.

Instrument said to be sturdily constructed with hardened tool steel four-inch shear and traveler. L.M. Gilbert Co., Dept. PVP, 420 Bourse Bldg., Fifth & Ludlow Sts., Philadelphia 6, Pa.



AINSWORTH

ANALYTICAL BALANCE
Automatic Type

Automatic recording, analytical balance shows instantaneous weight and rate of weight change, according to manufacturer.

Samples may be placed on balance pan or suspended in controlled environment above or below the balance. Capacity is 200 grams. Weight changes for long or short periods recorded on chart 11 inches wide representing 110 mg.

Accuracy and readability are ±1/10 mg. Balance automatically adds or subtracts weights as required to rescale recorder pen. Range of automatically controlled weights is four grams.

Wm. Ainsworth & Sons, Inc., Dept. PVP, 2151 Lawrence, Denver 5, Colo.

SILICONE RESIN
For Cold-Blending

A silicone resin designed for cold-blending with alkyd, melamine and acrylic type baking enamels to impart improved color and gloss retention, thermal stability and resistance to weathering has been developed.

Resin, designated R-64, is expected to find wide use as a base for aluminum paints to operate in

The difference between low profit margins

and high profit margins is often SYLOID® 308!

Flatting costs go down automatically when you add SYLOID 308 to your lacquer. Cost per unit of flatness is roughly one-third that of some competitive materials. Savings are gained in the mill room because SYLOID 308 mill bases can be made more concentrated and in very short grinding times. Your customers? They'll like the fine matte finish they get without hand rubbing. See your distributor today.

DAVISON
CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

te 500-1200° F. range. Said to be effective at concentrations as low as 10-20 per cent.

Other applications already developed include external coatings for heating equipment and exhaust systems and enamels for motors and electrical components and appliances.

Silicones Division, Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

PALMER

BARREL GRAB
Of Heavy Welded Steel

Barrel grab has been designed for picking up any type of wood or steel barrel from 40 inches diameter to small nail keg size without damaging interior or exterior of container.

Grab is designed on toggle principle, the heavier the load, the more rigidly it is held. Grab is constructed of heavy welded steel chains with tongs made of heavy steel bar stock. Weighs approximately 35 pounds.

Available in two standard sizes, half ton and one ton. Palmer-Bohle Co., Dept. PVP, 12622 Mansfield, Detroit 27, Mich.

IRE EXTINGUISHER
ry Chemical Type

Dry chemical powder for fighting flammable liquid and electrical fires has been made available in a 2½-pound pressurized extinguisher.

Portable extinguisher is recommended for on-the-spot protection against incipient fires in gas, oil, paint, propane, chemicals and electrical equipment. Accompanying bracket may be mounted near potential hazard areas.

Rubber valve assembly said to be leakproof. Quick and simple recharging also claimed. Depression of lever spreads 60-degree-wide-angle blanket of non-freeze, non-toxic, non-conducting dry chemical powder to range of 12 feet.

The Fyr-Fyter Co., Dept. PVP, 221 Crane St., Dayton 3, Ohio.

LIGHT-FADING TESTER
For Production Control

Research, testing and production control device for accelerating natural sunlight effects on coated and uncoated materials is now being offered.

Xenotest PL393 model tests for fading, photochemical changes and discoloration. Synthetic sunlight is produced by xenon lamp with suitable filters, which offers automatic operation including safety controls, and no continuous setting of carbon electrodes.

Lamp wattage is 1500, normal life is approximately 60 days. Two-by-four-inch specimens mounted on frames are rotated about the lamp. Frames may be rotated to simulate day-night sequence.

G. F. Bush Associates, Dept. PVP, Box 175, Princeton, N.J.

H. Kohnstamm & Co., color manufacturers for over 100 years, introduce their new line of color dispersions for water systems to be known as . . .

Kodis
COLORS
TRADE MARK

These colors offer many outstanding properties and advantages including —

- Excellent alkali resistance
- Excellent light resistance
- Excellent stability
- Finely dispersed to eliminate grinding
- Much cleaner than dry colors for water systems
- Much stronger than dry colors for water systems
- Much cheaper than dry colors for water systems
- Readily admixable to give a variety of shades
- Non-drying
- Non-settling on long standing
- Compatible with all latex emulsion paint systems

Avail yourself of the facilities of our sales service laboratory on all your color problems. Brochures and samples will be sent on request.

Experts in Color Technology for More Than a Century
H. KOHNSTAMM & CO. Inc.
89 Park Place, New York 7 11-13 Illinois Street, Chicago 11
2632 East 54 Street, Huntington Park, California
Branches in other principal cities of the U. S. A. and throughout the world

Another NEW 'HORSE HEAD' PIGMENT

XX-602 ZINC OXIDE

(LEAD FREE)

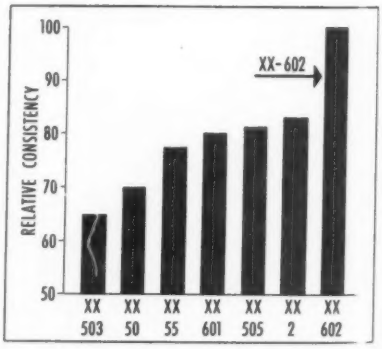
HIGHEST CONSISTENCY–ACICULAR

SAVES MONEY–IMPROVES QUALITY

Now a major new development in Horse Head zinc oxides—XX-602*—enables you to save money and improve the quality of your outside house paints.

SAVE MONEY

XX-602 imparts highest consistency—even higher than any other Horse Head zinc oxide (see chart). Thus you can obtain desired body with minimum pigmentation.



IMPROVE QUALITY

XX-602 provides excellent appearance, outstanding tint retention, low rate of chalking, high resistance to erosion, and good durability—because its particles are highly acicular (see electron micrograph) and free of colloidal fines.

But whether you need an oxide of high consistency, or low, or in between, you will find it in the Horse Head line — the most complete assortment of quality zinc oxides.

Our sales representative in your area will be glad to discuss the application of our various zinc oxides in your specific products.

*Meets military specification MIL-Z-15486A and federal specification TT-Z-301A.

THE NEW JERSEY ZINC COMPANY

Founded 1848

160 Front Street, New York 38, N. Y.

BOSTON CHICAGO CLEVELAND OAKLAND LOS ANGELES

Also Distributed by

VAN WATERS AND ROGERS

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HORSE HEAD PRODUCTS

PROOF OF READERSHIP

— a few comments from REVIEW Users

ALHAMBRA, CALIF. — *"I consider the* **REVIEW** *a great time saver."*

•••

DES MOINES, IOWA — *"A very helpful edition."*

•••

LOS ANGELES, CALIF. — *"Keep up the good work."*

•••

JERSEY CITY, N. J. — *"A perfect job. Most interesting and worthwhile."*

•••

SEATTLE, WASH. — *"Very fine as is."*

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MONTREAL, CANADA — *"Quite satisfactory and comprehensive. Serves as check list through its ads."*

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1. The Complete **Buyers' Guide** to New Materials and Equipment
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Company_____

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City_____ Zone____ State_____

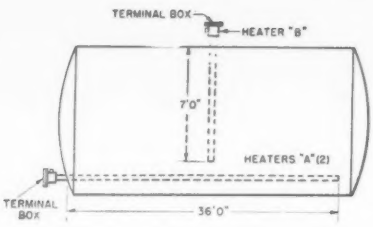
Products manufactured_____

NEW MATERIALS — EQUIPMENT

HEATING SYSTEM
For Phthalic Anhydride

System of heating by electricity has been developed for manufacturers and users of phthalic anhydrides.

Heating elements enclosed in three-inch diameter stainless steel pipes designed to give watt density of two watts per square inch of heating surface. Supplies required heat without subjecting material to high heater surface temperatures which discolor phthalic anhydride above 302° F. during prolonged heating.



TURBINE

Stainless steel tank holds 12,000 gallons. Two heating tubes supply total of 15 KW at 230 volts, three phase, 60 cycles. Heating elements may be withdrawn for inspection, repair or replacement without affecting contents of tank.

Hynes Electirc Heating Div., Turbine Equipment Co., Dept. PVP, Mountainside, N.J.

SUCCINIC ANHYDRIDE
Low Molecular Weight

Methyl succinic anhydride, low molecular weight solid, has been introduced in research quantities.

Product said to lengthen storage life of aliphatic or aromatic epoxy resin formulations. Permits mixing epoxy resin formulations at room temperature or slightly higher because of low melting point (37° C.).

As saturated acid anhydride, product will undergo most of usual anhydride chemical reactions, including hydrolysis, amidation, reduction, Friedel-Crafts reaction, Grignard reaction and esterification.

Eight-ounce samples available from Commercial Development Division, Chas. Pfizer & Co., Inc., Dept. PVP, 630 Flushing Ave., Brooklyn 6, N.Y.

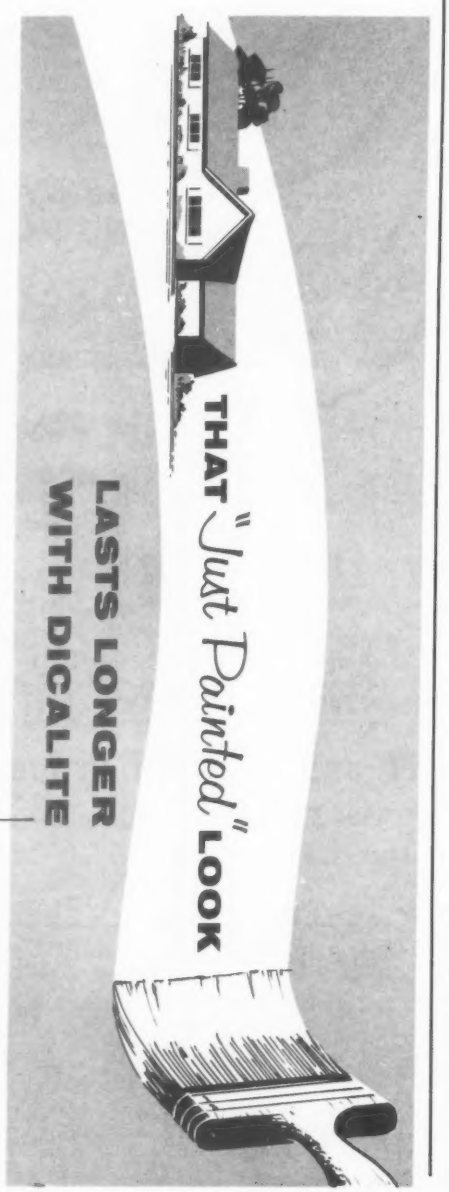
CHLORINATED COMPOUNDS
Semi-Commercial Quantities

Six chlorinated compounds utilizing p-xylene as the basic raw material have been made available in semi-commercial quantities.

Three ring chlorinated compounds are indentified as 2-chloro-p-xylene, 2,5-dichloro-p-xylene and 2,3,5,6-tetrachloro-p-xylene. Three chain chlorinated compounds are a-chloro-p-xylene, a, a′-dichloro-p-xylene and a,a′-hexachloro-p-xylene.

Chain chlorinated materials may be used as chemical intermediates in production of fungicides, dibasic acids and aromatic diols or glycols. Suitable for production of polyesters and polyethers for paints, enamels and lacquers and other protective and decorative industrial coatings. Ring chlorinated materials may find use as solvents.

Diamond Alkali Co., Product Development Dept., Dept. PVP, Research Center, Painesville, Ohio



DICALITE-AIDED PAINTS LAST LONGER AND COST LESS TO MAKE!

Test panels, exposed continuously for 5½ years in all extremes of Florida weather, have proved that outside house paints formulated with high-brightness Dicalite *do* stay fresh, new and bright *longer!* That's because the paint film, 'reinforced' with Dicalite, is tougher and more elastic – it holds the pigment better to slow down weathering and chalking, and practically eliminates blistering, flaking and peeling. The high brightness of Dicalite makes expensive prime pigments go much further, keeps whites white and colors clean and bright.

Write for your copy of the revised Dicalite Paint Bulletin C-23

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DEPARTMENT; GREAT LAKES CARBON CORP.
612 S. FLOWER ST., LOS ANGELES 17, CALIFORNIA

NEWS

A uminum Building Gets N wly-Developed Coating

The first large-scale coating of an industrial building with an aluminum and brick exterior has been accomplished by means of a butyrate lacquer, it has been announced by Eastman Chemical Products, Inc.

The plant, in Erie, Pa., was coated with a butyrate lacquer formulation, Pyroxcote 26-105. The half-second butyrate component of the lacquer was developed by Eastman Chemical Products.

A uniform coating of butyrate lacquer being applied rapidly with a standard spray gun on all restored surfaces.

Coating of the entire structure followed nine-month tests in which sample wall panels exposed to the elements and a fan exhausting dust, fumes and contaminated air were test-coated. The coating was found to restore the appearance of an old section of the building, and to protect the newer section from dulling, corrosion and pitting, all of which had been in evidence in the older section.

For the restoration of older surfaces, it was first necessary to remove all oxides and soil. A water solution of a chemical cleaner and brightener was brushed onto the surface of the aluminum, and washed from the surface after three to four minutes.

A passivating agent treatment followed the cleaning, the agent being washed off after two to three minutes contact. No haste was necessary in applying the lacquer after treatment, as the passivating agent prevented rapid recurrence of oxidation.

Thinned approximately 1½ times its own volume, a single coat of lacquer was rapidly sprayed onto the aluminum to achieve a coating approximately 0.3 mils thick at approximately 40 pounds pressure. The lacquer was applied with an ordinary gun from a portable tank.

When the lacquer was applied to new surfaces, the only pretreatment necessary was a thorough cleaning with a detergent.

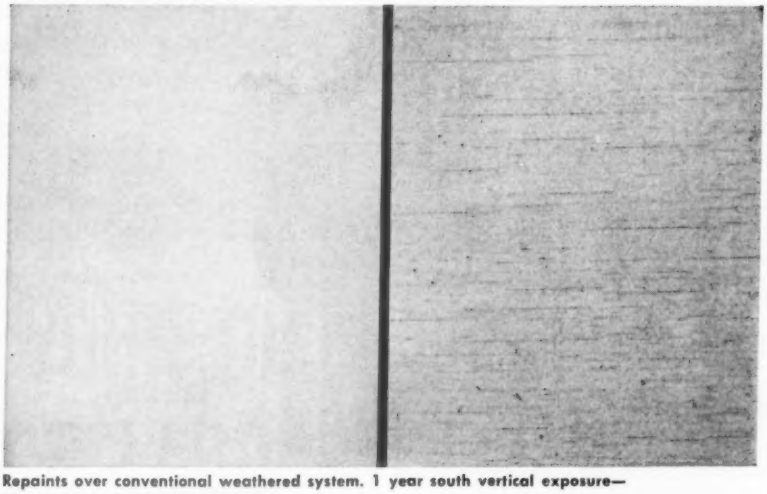
Development Unit Underway

American Cyanamid Co. has announced that construction is now underway on a product development laboratory and pilot plant for the plastics and resins division at Wallingford, Conn., site of the company's present plastics production facilities.

Full occupancy and operation of both units are expected by the latter part of this year. They are to be staffed by approximately 70 chemists, molding engineers and chemical engineers.

With the completion of the laboratory and pilot plant, the firm is to consolidate at Wallingford its plastics development work and technical sales service.

In low-luster paints, too:



Repaints over conventional weathered system. 1 year south vertical exposure—Central U. S. A. Magnification, IX.

ZINC OXIDE
MAKES THE DIFFERENCE

If you're concerned about the fitness of low-luster paints for exterior use . . . keep these photos in mind. AZI's recommended formulation (left) and a commercial, zinc-free, low-luster paint (right) were subjected to simultaneous exposure. The correct concentration of zinc oxide kept AZI's paint smooth and tight. The other paint has failed.

Tests like this further verify this fact:
An adequate ZnO content raises the level of performance of outside low-luster formulations . . . just as it improves the service and appearance of any good paint. It provides durability and film integrity . . . resists mildew, staining, and the destructive effects of ultraviolet light . . . imparts superior chalking characteristics.

Mail the coupon below. You'll receive laboratory reports as available on the use of zinc oxide in conventional and low-luster formulations — to assist you in assuring the quality of your exterior paints.

AZI

AMERICAN ZINC INSTITUTE, INC., Dept. B 3
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Please send me future laboratory reports and papers on paint formulation findings.

Name _____ Title _____
Company _____
Address _____
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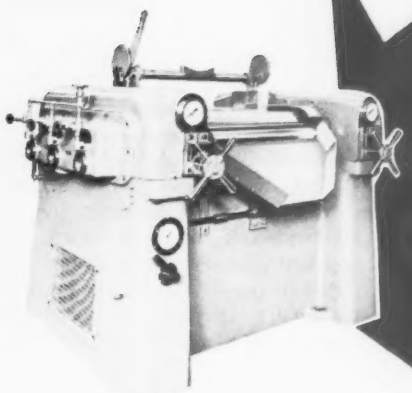
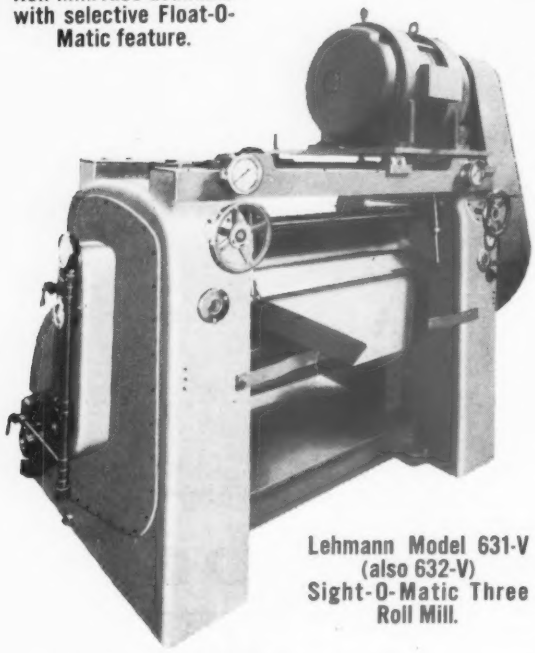


Lehmann Model 662-V (also 661-V and 663-V) Sight-O-Matic Three Roll Mill. Also available with selective Float-O-Matic feature.



Lehmann Model 631-V (also 632-V) Sight-O-Matic Three Roll Mill.

The LEHMANN 631-V VERTICAL and the 662-V HORIZONTAL THREE ROLL MILLS with SIGHT-O-MATIC® CONTROLS definitely improve quality, increase output, and reduce costs wherever they are installed. If your competitor has this equipment, and you do not, you are, in effect, yielding him a strong competitive advantage.

Current buyers' markets are becoming more selective every day. The manufacturer who uses less than the best production equipment can be sure of one thing—the money he "saves" by not buying modern machinery he will lose many times over in higher operating costs and reduced business.

We suggest you send for complete information regarding Lehmann Roller Mills and other up-to-date milling equipment—learn what savings in time and money can be yours by installing Lehmann units in your plant to bring your operating costs down to rock bottom.

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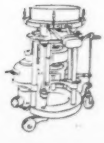
Lehmann's extensive line of equipment consists of: Vertical and Horizontal Roller Mills • Heavy-Duty Twin Paste Mixers • Sieving and Screening Machines.

Send for further information on any or all of the machines listed above.



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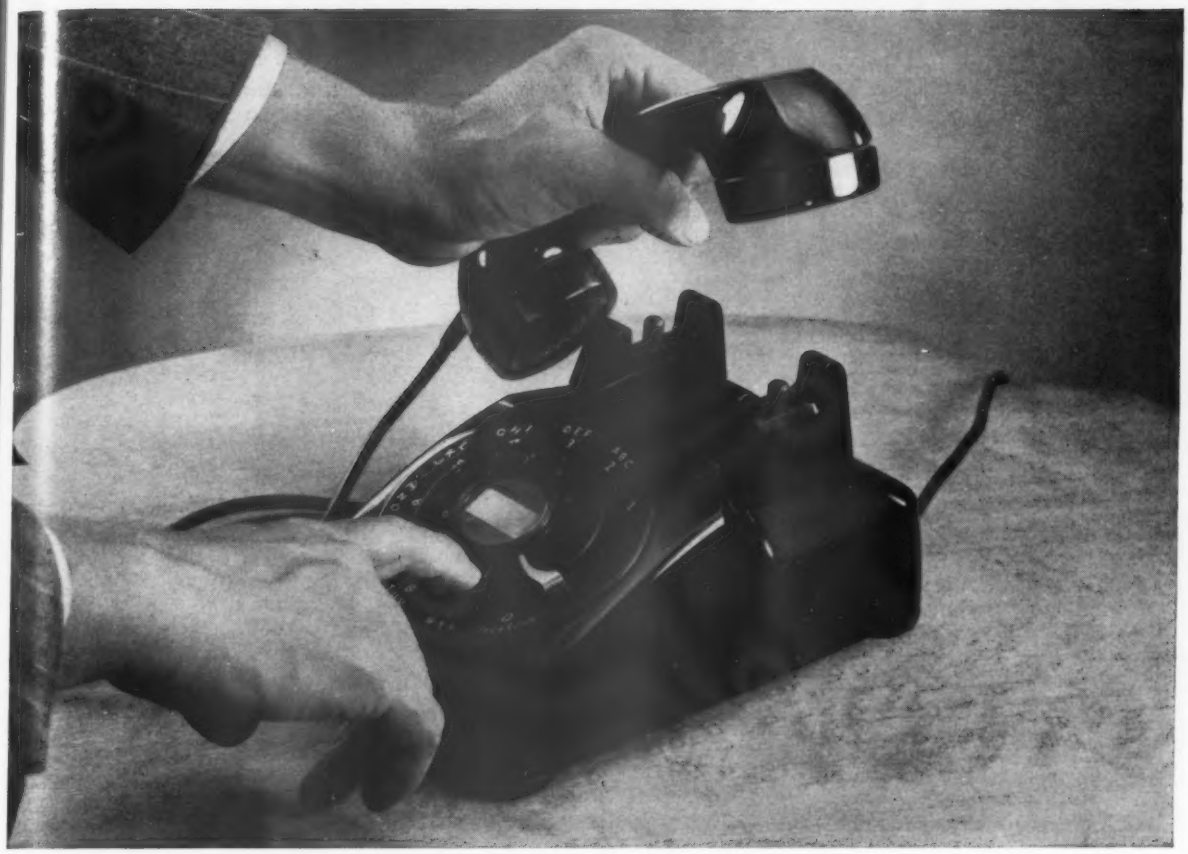

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7	HOUSTON, TEXAS Texas Solvents & Chemicals Co.
8	KANSAS CITY, MISSOURI Ack Sales Company
9	LOS ANGELES, CALIFORNIA Pacific Vegetable Oil Corp.
10	LOUISVILLE, KENTUCKY The Argus Co.
11	MILWAUKEE, WISCONSIN J. W. Copps
12	MINNEAPOLIS, MINNESOTA Horton-Earl Co.
13	MONTREAL, CANADA B. & S. H. Thompson & Company, Ltd.
14	NEW YORK, NEW YORK Pacific Vegetable Oil Corp.
15	PHILADELPHIA, PENNSYLVANIA Baker Industrial Oils Co.
16	PORTLAND, OREGON W. Ronald Benson, Inc.
17	SAN FRANCISCO, CALIFORNIA Pacific Vegetable Oil Corp.
18	SEATTLE, WASHINGTON W. Ronald Benson, Inc.
19	ST. LOUIS, MISSOURI Ivan T. Bauman Co.
20	TORONTO, CANADA B. & S. H. Thompson & Company, Ltd.

PERSONNEL CHANGES

HOLLAND COLOR

Clifton C. Candee has been named general manager of the company, it has been announced by the parent organization, National Cylinder Gas Co.

C. C. Candee

Mr. Candee takes over the general management of the firm's plant at Holland, Mich., and its nationwide sales and service program. He had previously been general manager of Sinclair & Valentine Co.'s pigment division.

He has also been technical director of Kinetic Dispersion Corp., and for 19 years had been employed with the Calco Chemical Division of American Cyanamid Co.

CARGILL

Peter G. Spindler has been named manager of the vegetable oil division's sales office in Chicago, it has been announced.

Mr. Spindler had been with the division's New York office for the past two years. He has been with the firm since 1953, serving in Minneapolis prior to his New York assignment.

John R. Crocker has been appointed to the division's Chicago office, it has also been announced.

Mr. Crocker joined the firm in 1954 after graduation from the University of Missouri. He has been with the firm's oil plant in Philadelphia, and he has handled sales to oil markets in St. Louis and the Southwest.

VICKERS PETROLEUM CO.

William K. Jackson has been named vice president of research and development of the company's newly formed chemicals division, it has been announced. He is also to become technical assistant to the president.

W. K. Jackson

Mr. Jackson had formerly been director of the chemical division of Cosden Petroleum Co. He is a graduate of Rice Institute, and he has been with Shell Oil Co. in several engineering capacities.

A. B. Mullaly

D. Mark

Arthur B. Mullaly has been named vice president of marketing and market development, and **Dewey Mark** has been appointed general sales manager for the chemicals division, it has also been announced.

Mr. Mullaly graduated from the Stevens Institute of Technology and completed studies with I. G. Farben Industries in Germany. He was formerly president of Advance Solvents and Chemicals Co., and he is a director of Carlisle Chemical Works.

Mr. Mark had formerly been chemical sales manager for Cosden Petroleum Co. He is a graduate of North Texas State College, and he holds a master's degree in Organic Chemistry. He attended the Indiana University Graduate School on a teaching and research fellowship in Organic Chemistry.

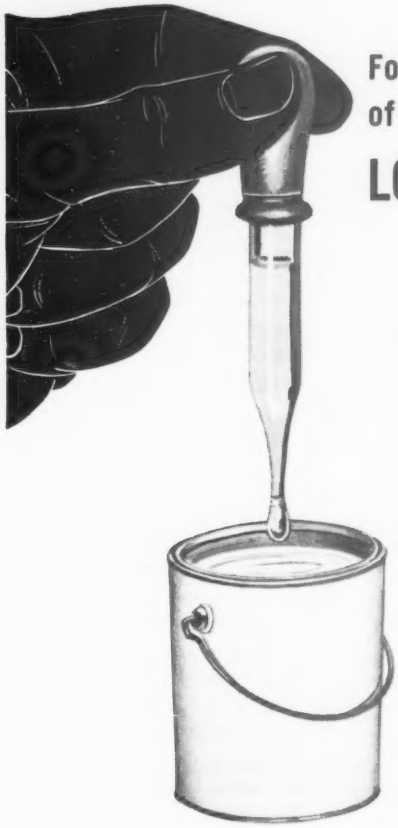
Richard R. Boushka has become sales coordinator for the new division, it has also been announced.

Mr. Boushka is an honor graduate of St. Louis University in geophysical engineering. He has been with the company since 1956. He was an All-America basketball player and a member of the U. S. Olympic team in 1955.

FREEMAN CHEMICAL CORP.

Donald W. Christensen has been appointed director of purchases, it has been announced.

Mr. Christensen had formerly been with the F. S. Royster Guano Co. He is a graduate of the University of Wisconsin. He is to be located at the firm's main offices in Port Washington, Wis.



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Although they are but a small part of the finished product, paint additives are a very necessary and important part. And the manufacturer who looks to Nopco for his supplies wins more ways than one. Because Nopco manufactures a complete line of paint specialties, you can place a single order to cover all your needs and qualify for quantity price discounts. Because Nopco plants are strategically located, you can count on fast delivery and save on freight as well. And because of the years of experience behind the Nopco line, you can be sure of competent technical services.

Write for a booklet fully describing the Nopco line. Nopco Chemical Company, Harrison, N.J., or Richmond, Calif.

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- Pigment Dispersing Agents
- Freeze-Thaw Stabilizers
- Thickeners
- Viscosity Stabilizers
- Surface Active Agents
- Stearates

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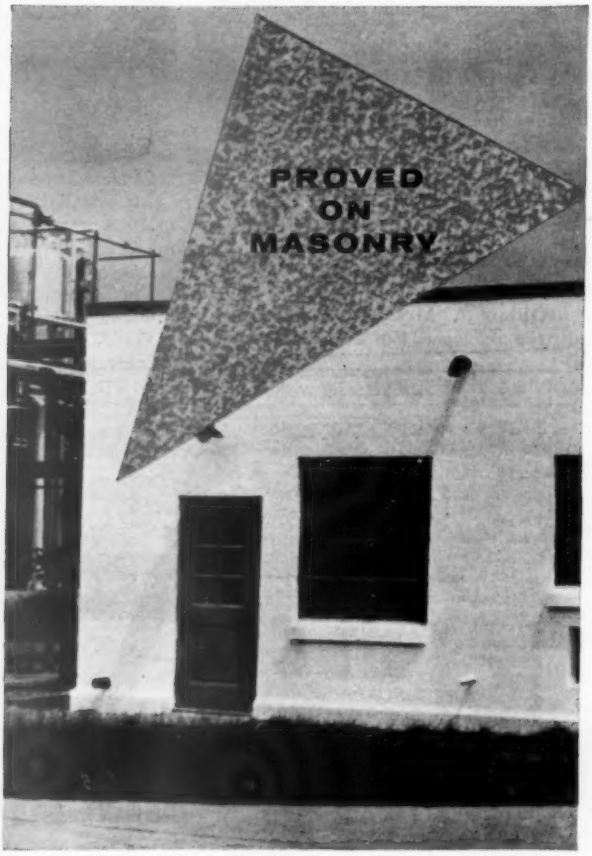

new GEON VINYL latices produce outstanding paint formulations

THE house was painted 1½ years ago with a formulation using as a binder Geon 450X3, an acrylic copolymer with these remarkable advantages:

- **internally plasticized to simplify paint manufacture**
- **excellent adhesion on wood and asbestos—even when wet**
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- **waterproof to exterior penetration, yet permits escape of interior moisture**

The building was painted 2 years ago with a coating based on Geon 970X11, an improved polyvinyl acetate latex. For both interior and exterior masonry it provides these advantages:

- **stability and uniformity**
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- **good water vapor transmission and alkali resistance, important in primer-sealer paints**

Get more information about the excellent performance of formulations made with these new Geon latices. Write for booklet or trial samples to Dept. LK-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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GEON polyvinyl materials • HYCAR American rubber and latex
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SHELL CHEMICAL CORP.

Thomas F. Mika, formerly assistant to the sales development manager, has been appointed assistant to the sales manager, it has been announced.

T. F. Mika

Mr. Mika is a graduate of the Illinois Institute of Technology. He has been with the company since 1946, when he became a chemist in the market development department. He has been supervisor of research in polymer and chemical applications and in plastics and resins.

William A. McCormick, St. Louis district manager, has been named assistant to the sales development manager, replacing Mr. Mika, it has also been announced.

J. R. Brady

W. A. McCormick

Mr. McCormick joined the company in 1948 as a junior technologist in the marketing department. He has been technologist in industrial chemicals and senior technologist in marketing administration. He is a graduate of U.C.L.A.

John R. Brady, Jr., replaces Mr. McCormick as St. Louis district manager. He had previously been senior technical salesman of the company's Torrance, Calif., synthetic rubber sales division.

Mr. Brady received a Chemical Engineering degree from the University of Michigan before joining the company as a technical salesman in 1948. He had been district representative and technologist in company offices at Newark, N. J., and New York prior to his assignment in Torrance.

NEWPORT INDUSTRIES

Edwin G. De Laney has become Philadelphia district manager, and **Christy A. Brier** has been appointed technical sales representative for northern New Jersey, it has been announced.

Mr. De Laney is a graduate of Swarthmore College. He joined the firm in 1953, and has been serving as technical sales representative in the New York district.

Mr. Brier has been associated with the paint industry in the New York area for more than 20 years. He is a graduate of Pratt Institute, and has taken additional studies at Polytechnic Institute of Brooklyn.

SPENCER KELLOGG

Alfred S. Kohl has been named assistant vice president by the firm's board of directors, it has been announced.

Mr. Kohl continues in the capacity of director of foreign operations, in which he has been serving since last July.

W. J. Goodrum has been appointed senior chemical engineer in the firm's research division, it has also been announced.

Mr. Goodrum had been in the production division for the past nine years. He had previously spent two years at the firm's mill in Minneapolis.

AMERICAN ZINC SALES

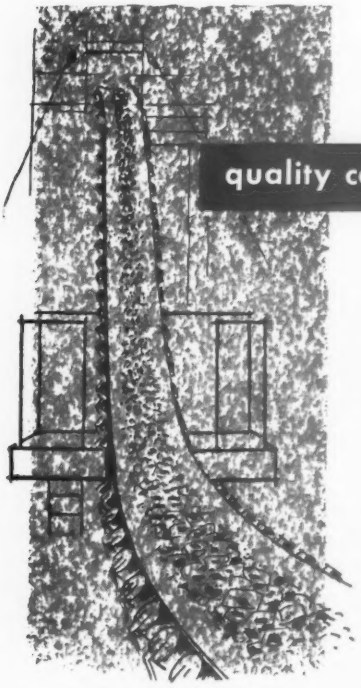
E. A. Custer has become assistant manager of sales, it has been announced. He has been with the firm since 1948.

Mr. Custer is a graduate of Princeton University, and he has done postgraduate work at New York University. He has been with the general chemical division of Allied Chemical & Dye Corp., and later with F. W. Berk & Co. of New York.

In 1951 he was assigned to the firm's general offices in St. Louis, where he has been in charge of sales of sulfur, acid and special products.

CELLOFILM

Stanley Eysman has been appointed vice president in charge of sales, it has been announced by the Board of Directors of the firm.



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ESTABLISHED 1890

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New York 13, N. Y.

WI CO CHEMICAL CO.

ichard H. Dorsett has joined the firi 's sales staff, it has been announced. He s to be attached to the Houston sales offi e.

Mr. Dorsett had formerly been with the sales department of the plant food div sion of Olin Mathieson Chemical Co He is a graduate of Texas A. & M.

R. H. Dorsett

D. L. Johnson

Donald L. Johnson has become a sales representative at the firm's San Francisco office, it has also been announced.

Mr. Johnson had formerly been a paint chemist with E. I. du Pont de Nemours & Co., Inc., and a technical representative for California Ink Co. He attended the University of California.

NATIONAL CAN CORP.

Russel H. Winters has been appointed executive vice president for sales, it has been announced by Robert S. Solinsky, president.

Mr. Winters has been prominent in the food packing industry, and was vice president and production manager of the Larsen Co., major Midwest vegetable canner, prior to his new association.

He is a graduate of Westminster College, and he holds a master's degree from the University of Illinois. Prior to his work in the food packing industry, he had been a sales research engineer for a major can manufacturing company.

DU PONT

Willard F. Spengeman has been appointed director of the technical service laboratory of the pigments department, it has been announced.

Mr. Spengeman has been manager of echnical sales. He has been with the company since 1937, when he became a research chemist at the Newark, N. J., pigments plant. He became assistant chemical director in charge of dry colors at Newark in 1946, and research supervisor of the color sales service laboratory in 1949. He earned a bachelor's, a master's and a doctorate at he University of Wisconsin.

y Gonick, technical supervisor at the Edge Moor, Del., pigments plant, has been named assistant director of the laboratory, it has also been announced.

Dr. Gonick is a graduate of Drew University, and he received a doctorate in Inorganic Chemistry from Pennsylvania State University. He joined the company in 1951 as a chemist at the Newport, Del., plant, and was promoted to technical supervisor at Edge Moor in 1955.

Charles F. Oppermann has become technical service representative for the company's pigments department in the Chicago area, it has also been announced.

Mr. Oppermann has done sales work for the pigments department for the past 13 years. He is a graduate of Cooper Union College, with a B.S. in Chemical Engineering. He holds an M.A. in the same field from Columbia University.

VALSPAR CORP.

Dr. Charles A. Coffey has been appointed an assistant vice president of the corporation, it has been announced by L. B. Hartnett, president.

C. A. Coffey

Dr. Coffey is to continue in his present position as technical director. He has had 25 years of experience in the oil and paint industries, devoting much of his time to directing group research and product development programs in the paint and varnish fields.

He received a Ph.D. in Chemistry from the University of Iowa.

For plus gallonage in '58 take this first step NOW

In today's *buyer's market*, the plus gallonage goes to the manufacturer selling extra product benefits.

Write us today for three reports on a new, powerful sales tool—*Nuozene Paste—the Nuodex Additive that makes paints self-sanitizing.*

The benefits of self-sanitizing paints are specific and proved by government standards. Self-sanitizing paints are not only *mildew-resistant*, but *germ-proof as well. They have immediate, big-volume markets as industrial maintenance finishes, in food processing plants, in hospitals, in kitchens. And the *self-sanitizing** property is the *plus* that opens up the whole interior-coatings field for your premium paints.**

Let us send you up-to-the-minute reports on Nuozene Paste for (1) self-sanitizing paints; (2) mildew-resistant industrial maintenance paints; (3) blister-resistant paints. (These reports supersede previous reports.)

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***A germ-proof, self-sanitizing paint film kills on contact the most commonly encountered fungi and bacteria.*

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A DIVISION OF HEYDEN NEWPORT CHEMICAL CORPORATION
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GENERAL ELECTRIC

Leroy A. Claybaker has been appointed supervisor of manufacturing at the company's phenolic operation at Coshocton, Ohio, it has been announced.

Mr. Claybaker is a graduate of the University of Oklahoma, and holds a B.S. in Chemical Engineering. He served as an instructor at Oklahoma State University's Chemistry Department before joining the company's plastics laboratory at Pittsfield in 1947.

He has been a product engineer since 1950, for the chemical materials department and the phenolic products engineering section.

Dean Daniels has become Western district sales manager for the silicone products department, it has also been announced.

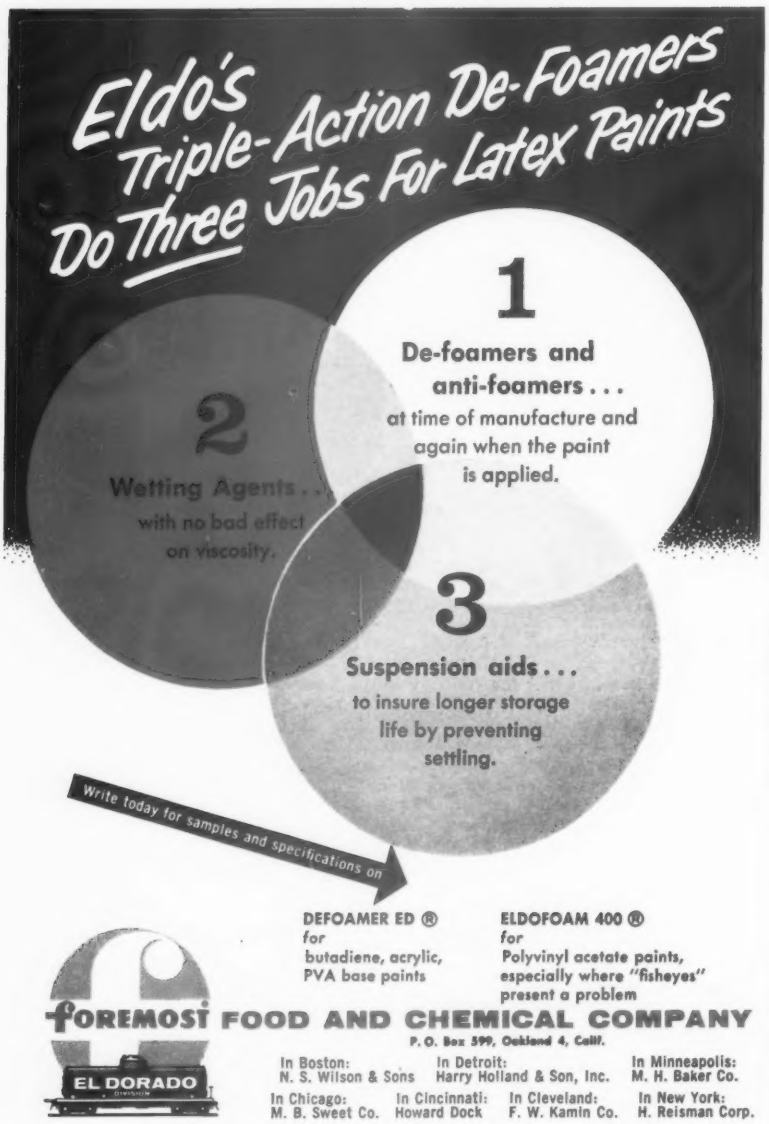
Mr. Daniels has been a member of the West Coast sales force for eight years. He joined the firm in 1946 after graduation from the Missouri School of Mines.

HODAG CHEMICAL CORP.

John Roach has been named vice president in charge of production and development, it has been announced. He had formerly been chief engineer of the firm.

Mr. Roach has been with the company since 1954, after serving as plant superintendent for Witco Chemical Co. He had previously been a plant process engineer for E. I. du Pont de Nemours & Co., Inc.

He is a graduate of the Illinois Institute of Technology with a degree in Chemical Engineering.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De-foamers and anti-foamers . . .
at time of manufacture and again when the paint is applied.
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Wetting Agents . . .
with no bad effect on viscosity.
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Polyvinyl acetate paints, especially where "fisheyes" present a problem
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In Chicago: M. B. Sweet Co.
In Cincinnati: Howard Dock
In Cleveland: F. W. Kamin Co.
In New York: H. Reisman Corp.

CIBA CO.

Morton M. Gruber has become sales manager for the firm's epoxy coating resins, it has been announced.

M. M. Gruber

Mr. Gruber has been in the protective coatings industry for the past 27 years, serving as sales manager of synthetic resins for Archer-Daniels-Midland Co., U.S. Industrial Chemical Co. and Reichhold Chemicals, Inc.

He has served in various capacities for the National Paint, Varnish & Lacquer Assoc., the New York Paint, Varnish & Lacquer Assoc. and the Manufacturing Chemists Assoc. He has also served on advisory committees for the government.

GODFREY L. CABOT

Harry Collyer has been appointed to the firm's Boston office as manager of foreign technical service, it has been announced.

Mr. Collyer joined the firm in 1946 after serving as a research assistant at the Massachusetts Institute of Technology. He is a graduate of Tufts College with a B.S. in Chemical Engineering. He has been manager of technical service for the firm, and he had been European technical manager prior to his new assignment.

Edward Eaton has been appointed to the firm's Paris office as resident European technical manager, it has also been announced.

Mr. Eaton is a graduate of Northeastern University. He worked in the rubber industry prior to joining the firm in 1953. He has been in the technical department and he has served as technical representative in the Southwest area.

William Campaigne has been assigned to the firm's Pampa, Tex., office as Southwestern technical service representative.

Mr. Campaigne is a chemical engineering graduate of the University of Minnesota. Prior to joining the firm he had been in the industrial products division of the Goodyear Tire & Rubber Co.

UNION CARBIDE CHEMICALS

Six technical representatives have completed their training in the general sales office in New York, and have been assigned to district offices.

The assignments are: **William C. Friedemann** to Houston, **Thomas M. Fulton** to Los Angeles, **Gordon H. Heggland** to Cincinnati, **Nicholas J. Hill** to St. Louis, **James R. Leusch** to Boston and **J. Thomas Revell** to Newark.

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Formulations for every requirement, in any combination of solvents, at prices which antiquate "cutting your own."

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You choose the PVAc paint
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COLTON EMULSIONS ARE PROFIT MAKERS
Flexbond 800: Best for all-around formulations . . . for primer sealers, interior flats, exterior paints, industrial finishes.
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Here is the most complete handbook of its kind ever assembled . . . more than 22 paint formulas, 13 product bulletins, technical papers, price lists, handy chart. Write now for your copy to Department E7

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NUODEX PRODUCTS CO.

Frank X. Dwyer has been appointed general sales manager, it has been announced by W. J. Houston, vice president of marketing.

F. X. Dwyer

Mr. Dwyer joined the firm in 1949 as regional sales representative, and has been a regional sales manager since 1953. He is a graduate of Wesleyan University.

He is to be responsible for sales operations through regional sales managers and representatives and manufacturers' agents throughout the country.

William B. Philipbar, Jr., has been named product sales manager of the stearates division, it has also been announced.

Mr. Philipbar joined the firm after an association with Esso Standard Oil Co. He is a graduate of Cornell University.

DEWEY AND ALMY

Thomas G. Gibian has been named general manager of the firm's organic chemicals division, it has been announced. He will also continue as general manager of the battery separator division.

Mr. Gibian is a graduate of the University of North Carolina, and he holds a Ph.D. from the Carnegie Institute of Technology. He joined the firm in 1951 as a development engineer, after serving as a research chemist with the Atlantic Refining Co.

He succeeds **Russell L. Haden,** who has joined the Virginia-Carolina Chemical Corp.

PECORA, INC.

H. **Wesley Hibbert,** former executive vice president, has become president of the firm, it has been announced by William B. Bullock, chairman of the Board.

Mr. Hibbert has been with the firm for 19 years. He has been replaced as executive vice president by **Laurence Bowen, Jr.,** vice president.

EMERY INDUSTRIES

Malcolm R. Tucker has become fatty acid sales representative for the Cincinnati territory, it has been announced.

Mr. Tucker has been with the firm for seven years, and had been a supervisor in the production department prior to his new appointment. He is a graduate of Wilmington College, and he has attended the University of Cincinnati and the University of Dayton.

EASTMAN CHEMICAL PRODUCTS

Robert H. Cannon has been named to direct sales of chemicals and dyes in the New England and Middle Atlantic states, it has been announced.

Mr. Cannon had formerly been in charge of the chemical division's New York office. His new assignment includes responsibility for the company's distribution center at Lodi, N. J.

John H. Sanders has become regional sales manager in charge of the Cleveland, Cincinnati and Greensboro, N. C., offices, it has also been announced.

Mr. Sanders had previously been producat manager at Kodak's Texas Eastman Co. division, and had been in charge of the chemical division's Cleveland office.

Decatur B. Campbell, Jr., has become regional sales manager of the Chicago, St. Louis and Houston offices. He had previously been in charge of the Chicago office.

W. P. FULLER & CO.

Neal Fuller has been appointed paint department manager of Fuller Panama Corp., it has been announced by A. H. Brawner, Jr., manager of the international division and president of the Panama firm.

Mr. Fuller had formerly been on the staff of the San Francisco branch export department, where he specialized in Latin American business.

Eugene Gutierrez, who has been serving as vice president and general manager of the Panama organization, is to return to the United States, it has also been announced.

EAGLE-PICHER

Harry B. Stephenson has been appointed to the technical sales service department of the firm's chemical division, it has been announced.

H. B. Stephenson

Mr. Stephenson is a graduate of Kansas State Teachers College, where he majored in Chemistry. He has been with the firm since 1942, when he became a research chemist. He is to serve as liaison between the research and technical sales service departments.

ARCHER-DANIELS-MIDLAND

Clyde C. Meinhoefer, president of the firm's Canadian subsidiary, has been named assistant to the president of the parent organization, it has been announced.

Mr. Meinhoefer had been president of the Canadian subsidiary since 1956. He joined the firm in 1932 as a chemist, and later served as plant manager and general manager at Toronto. He was elected vice president of the Canadian subsidiary in 1943. He is a graduate of Detroit Institute of Technology.

Mr. Meinhoefer succeeds **Harry R. Wortham,** who has become assistant manager of the linseed division. Mr. Wortham, an assistant vice president of the firm, had been director of operations of the flat fibre division before becoming assistant to the president. A graduate of the University of Minnesota and the St. Paul College of Law, he has been with the firm since 1947.

John H. King has been named to succeed Mr. Meinhoefer as president of the Canadian company, it has also been announced.

Mr. King joined the Canadian firm in 1939 as a foundry products salesman. He became secretary of the firm in 1943, sales manager in 1945, secretary-treasurer in 1950, and vice president and treasurer in 1956.

Herbert L. Wilkins, production coordinator for the linseed division, has retired, it has also been announced. He is to remain on a consulting level, however.

Mr. Wilkins joined the firm in 1916, becoming assistant superintendent of the oil mill in 1920 and later superintendent and plant manager. He was appointed production coordinator for the linseed division in 1956.

R. J. BROWN

Frank A. McGrath has been named manager of the Buffalo division, it has been announced. He had formerly been with Frontier Oil and Refining Co.

John T. Dailey, sales representative in the Middle South, has been transferred to Buffalo to assist Mr. McGrath, it has also been announced.

NATIONAL CHEMICAL & MFG.

Thomas P. Moran, chief chemist and plant superintendent, has been elected a vice president of the corporation, it has been announced.

T. P. Moran

Mr. Moran has been with the company for 18 years, and has been chief chemist and plant superintendent for 14 years. He is generally recognized as one of the leaders in the development of emulsion paints.

He is a graduate of Loras College, and has done graduate work at Loyola University and the University of Chicago. He is vice president of the Chicago Paint and Varnish Production Club.

CENTRAL PAINT & VARNISH

Norman Mechanic, general plant manager, has been promoted to vice president in charge of laboratories and manufacturing, it has been announced.

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AUTOMOTIVE LACQUERS

(*From page 45*)

Areas A, B and C, the acrylic lacquer, nitrocellulose lacquer and enamel, respectively, have become dull, while the half-second butyrate lacquers have maintained a relatively high level of gloss. Area E in the center of the panel has the highest gloss. Slight buffing with a cloth returned the film to practically its original gloss.

Before exposure, all areas were approximately the same grey color, and had been rubbed (with the exception of the enamel) to approximately the same high gloss. The recommended drying schedules were allowed for each material before rubbing. The panels were not waxed before exposure, and after exposure were washed with cold water only.

Suppliers of Ingredients

1. France, Campbell and Darling, Inc.
2. Hercules Powder Co., Inc.
3. Mineral Pigments Corp.
4. C. K. Williams & Co.
5. International Talc Co., Inc.
6. The New Jersey Zinc Co.
7. Godfrey L. Cabot, Inc.
8. Eastman Chemical Products, Inc.
9. E. I. du Pont de Nemours & Co., Inc.
10. Barrett Division, Allied Chemical & Dye Corp.
11. Dow Corning Corp.

BS-19-1

Ingredients	Weight, %
Grind*	
Ti-Pure R-610[9] + tinting pigments	9
Half-Second Butyrate	10.5
Solution	
Plaskon 3105 (60%) resin[10]	14.2
Dow Corning Z-6021 (40% nonvolatile)[11]	4.2
Toluene	20.1
"Tecsol", 95%	7
Butyl alcohol	7
Isobutyl acetate	21
Cellosolve	7
	100
Nonvolatile, %	29.7
Viscosity, cps., 25°C.	130

*The grind was prepared in chip form on a two-roll rubber mill; however, other methods will be satisfactory.

Formulation II. Half-Second Butyrate lacquer used on Area E.

The lacquer was diluted with approximately one part of thinner (80/20 toluene/"Tecsol" 95%) to four parts of lacquer. This is a fast air-drying lacquer requiring less than five minutes dry time at room temperature between coats.

PS-15-1

Ingredients	Weight, %
Solution	
Tricresyl phosphate	2
FCD 565 (60%) resin[1]	18.4
Methyl ethyl ketone	5
Toluene	12.1
Grind	
RS ½ sec. nitrocellulose (70%)[2]	10
Zinc chromate, basic, M-1828 pigment[3]	3
Iron oxide WF-B-2093F pigment[4]	16.5
Asbestine 3X pigment[5]	3
Barytes No. 1 pigment[3]	1.5
Lithopone 806 pigment[6]	3
Wollastonite P-1 pigment[7]	3
Isobutyl acetate[8]	12.5
"Tecsol", 95%*	10
	100
Nonvolatile, %	50

*Eastman proprietary ethyl alcohol.

Formulation I. Primer used under Areas D, E, and F.)

The grind was milled for 24 hours in a ball mill and added to the solution. This formula closely follows that of MIL-P-11414A. It requires dilution with an equal volume of thinner. This primer was selected from many others on the basis of adhesion and sandability.

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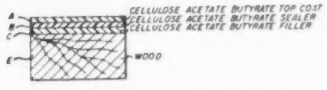
PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Wood Finishing Lacquer Systems

U.S. Patent 2,819,983. Martin Salo, Gerard J. Clarke and John F. Gallagher, Rochester, N.Y., assignors to Eastman Kodak Co., Rochester, N.Y., a corporation of New Jersey.

An article comprising a wooden structure having thereon a ternary wood-finishing lacquer system having a cellulose acetate butyrate base in each of the three components, a filler coat comprising 2-30 parts cellulose acetate butyrate, magnesium silicate and 10-30 parts of an adhesive resin selected from the class consisting of non-oxidizing pure short-oil alkyd resins, semioxidizing pure medium-oil alkyd resins, vinyl chloride-acetate dibasic acid copolymers, aryl sulfonamide-formaldehyde co-adensate, and terpine acetate-rosin-coester, a sanding sealer comprising 10-100 parts of cellulose acetate butyrate, 90-10 parts of a rosin maleic acid condensate, and a plasticizer, a top coat comprising 40-90 parts cellulose acetate butyrate, a plasticizer selected from the class consisting of dibutyl phthalate and dioctyl phthalate, and 10-30 parts of a hard resin selected from the class consisting of Dammar, ester gum, an oxidizing short-oil alkyd resin and a rosin-modified alkyd phenolic resin.



U. S. Patent No. 2,819,983

Stain and Filler

U.S. Patent 2,820,711. Myron W. Kiebler, Jr., Cleveland, and Richard Baukema, Lakewood, Ohio, and Albert Zier, Chicago, Ill., assignors to The Glidden Co., Cleveland, Ohio, a corporation of Ohio.

A partially-neutralized linseed oil-alpha,beta unsaturated dicarboxylic acid condensation product resulting from (*a*) the chemical condensation of from 6 to 9 parts of an alpha,beta unsaturated dicarboxylic acid selected from the group consisting of maleic acid, maleic anhydride, fumaric acid, and mixtures thereof, with a complementary amount of from 94 to 91 parts of a linseed oil product selected from the group consisting of raw linseed oil and alkali-refined linseed oil, and (*b*) the neutralization with ammonia of from 40 to 70 percent of

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the resulting acidity of said condensation product, said partially-neutralized condensation product being characterized (A) by its ability to form a clear aqueous solution when one part by weight of the solids of said condensation product is mixed with about one-fourth part by weight of ethylene glycol monobutyl ether and with a total of about three-fourths part of water by weight, and (B) by its ability to form a dry, adherent, non-water-sensitive, protective film when a coating of an aqueous solution as defined in (A) above is applied to a non-porous surface and allowed to dry.

Waxy-N-Vinyloxyalkyl-Alkane-Carboxamides

U. S. Patent 2,816,880. Sidney Melamed, Philadelphia, Pa., assignor to Rohm & Haas Co., Philadelphia, Pa., a corporation of Delaware.

A composition comprising a compound having the formula

$$CH_2{:}CHOANRCOR'$$

where A is an alkylene group having 2 to 3 carbon atoms of which at least 2 in a chain separate the adjoining ether oxygen and nitrogen atoms, R is selected from the group consisting of H and CH_3 and R′ is an alkyl group having from 11 to 17 carbon atoms.

Cerium Oxide Polishing Composition

U. S. Patent 2,816,824. Harold Wilansky, Corning, N. Y., assignor to Corning Glass Works, Corning, N. Y., a corporation of New York.

A polishing composition comprising an aqueous suspension containing about 3 to 6% of solids consisting essentially of cerium oxide and a freshly precipitated, gelatinous, substantially water-insoluble metal silicate amounting to about 1 to 25% of said solids on the dry basis, the silicate being about 0.3 to 0.5% of the entire composition.

New Cadmium Sulfide Yellow Pigments

U.S. Patent 2,819,175. Helmut Flasch, Leverkusen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany, a corporation of Germany.

A light-fast, atmospherically stable yellow pigment essentially consisting of cadmium sulfide having about 0.2 to 1% selenium incorporated in its lattice.

Stabilized Phenolic Resins

U. S. Patent 2,816,876. Louis M. Higashi, San Jose, Calif., assignor to Monsanto Chemical Co., St. Louis, Mo., a corporation of Delaware.

An alkaline catalyzed phenol-formaldehyde resin containing from 0.2 to 5% by weight of the resin of a triaryl phosphite, said resin having a pH of less than 6.5 prior to being cured.

Synthetic Drying Oils

U.S. Patent 2,819,302. Donald F. Koenecke, Louis A. Mikeska and Anthony H. Gleason, Westfield, N.J., assignors to Esso Research and Engineering Co., a corporation of Delaware.

A process for improving the hardness of films of polymeric drying oils prepared by polymerization of 60 to 100 parts of a conjugated diolefin of 4 to 6 carbon atoms and 40 to 0 parts of styrene in the presence of metallic sodium which comprises first reacting the oil at a temperature between 50° and 250°C. with maleic anhydride and then reacting the resulting product with about 0.1 to 1 mole, per mole of available carboxyl groups, of a compound selected from the group consisting of 2-amino-2-methyl propane diol-1,3, and 2-amino-2-(hydroxymethyl) propane diol-1,3.

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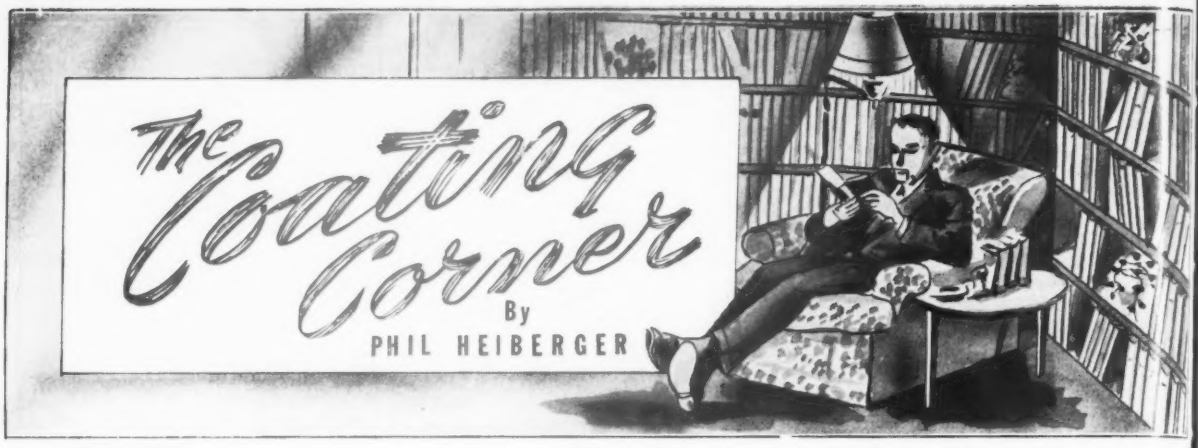

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Photochemical Changes

IN his introduction to the paper, "Photochemical Changes on Pigment Surfaces" [JOCCA ***40***, 935 (1957)], H. F. Clay writes "Work on photochemical reactions has led to an appreciation of the importance of minor deviations from stoichiometric compositions and the part played by the presence of traces of impurities, either within the crystal or on the surface. It may well be that an impetus to further research on photochemical phenomena will be provided by the work which is now being done on transistors."

Clay continues, "Considerable progress has been made on photochemical behavior of paint pigments. It is now appreciated that photochemical processes are much more common than was at one time thought possible..... Photochemical changes associated with pigmented systems fall into two groups:

a) Shade changes of pure pigment or of a tint. In the case of tints, the changes in the colored pigment may be promoted or retarded by photochemical changes involving the white pigment.

b) Breakdown of the system itself, as indicated by loss of gloss or chalking."

Phil Heiberger

These words may be somewhat unwelcome to the ears of those of us who have fallen into the popular habit of blaming all paint failures on the vehicle (sic). Time was—perhaps 20 years ago—when one vehicle, linseed oil, dominated the industry. The reactivities of pigments were recognized as a key factor in paint formulation. Then, as startling advances were made in polymer chemistry, and as it became easier to modify alkyds and varnishes, a better understanding of the resin portion of the paint was achieved. Newcomers to the industry began to think of pigments only in terms of their color, cost, and inertness, and to disregard pigments' other contributions to paint films.

Now, apparently, a cycle is being completed, and pigments are beginning to be recognized as important and ill understood components of a coating system.

It's unfortunate, in a way, that the old classical ideas that were so comfortable to work with be discarded, and the newer theories, so much complex, must be adopted. But, that's progress for you.

Quoting Clay again, "a rather roundabout indication of the connection between the two types of change is the observation that a thin coating of alumina has been recommended at different times for increasing the darkening resistance of lead chrome, decreasing the chalking of lithopone, and improving the tint retention of titanium pigments."

In a section devoted to a discussion of this paper, one observor is reported to have said that at least three common pigments, (chrome yellow, zinc oxide, and titanium dioxide) play quite a chemical role in films, and he imagines later work will show this to be not at all uncommon, especially among inorganic pigments." *Law of Definite Proportions*

My interest in discussing Clay's excellent paper is not so much to reemphasize the photochemical as-

pe's of pigment surfaces, but rat er to speculate a bit beyond it. Th mention of "importance of mi or deviations from stoichiome ric composition" strikes me as a r ost significant statement since thi is one area unknown to most ch nists.

fter all, one of the first things dr nmed into beginning students of hemistry is the law of definite pr portions. We may tend to forget what follows, but not our very firs lesson. For this reason, the importance of non-stoichiometric compounds in related fields, such as metallurgy, catalysis, ceramics, and electronic components cannot help but create confusion in the mind of a classical chemist.

Catalysts

IN many ways, the study of contact catalysis may cast light on our knowledge of pigment surfaces. Paul H. Emmett in "Twenty Years of Progress in Contact Catalysis" (Chapter 2, *Modern Chemistry For The Engineer And Scientist, G. R. Robertson, Editor, 1957*, McGraw-Hill) states "Probably... in no other instance has thinking undergone a more radical change in the field of catalysis than in concepts as to the nature of a catalyst surface."

Evidence is mounting that one of the most important factors affecting the activity of catalysts is the geometric spacing of the atoms on the surface of the catalyst. In addition, it appears that the electronic properties of solids might also be very important characteristics related to the activity of the solids as catalysts. Specifically, it was suggested that it might be profitable to classify catalysts as conductors, semi- conductors, and insulators.

Lattice Defects

In the great class of metallic oxides and metal sulfide catalysts now included under the general title of sem-conductors, the new point of view suggested that the catalyst's activity is associated with lattice defects.

Of known lattice defects, three are indentical to those mentioned by Clay. These are: 1. Imperfect crystals. 2. Non-stoichiometric crystals. 3. Impurity systems.

Thus, once again, apparently unconnected areas of knowledge turn out to be intimately related. Thus, if defect systems are responsible for photochemical, electrical, and catalytic phenomena, it stands to reason that pigments may be involved in many solid state reactions in both paint and film—more, in fact, than anyone might have suspected or desired. This also may explain anomalies in drying behavior and film behavior which have seemed to defy classification.

Professor A. C. Zettlemoyer stated very succinctly in his 1957 Mattiello Lecture that, "the seat of the complex rheological properties of printing inks is the interface between pigment and vehicle. At the interface, interactions occur between the two. This interaction in printing inks (or paints) is quite complex because the surfaceof the pigment is usually heterogeneous and because the vehicle is almost always a mixture of many compounds."

Electrical charges exist also on pigment surfaces, and can be related to surface impurities as well as crystal defects. For a fuller exposition of that behavior, see a paper by G. Florus and K. Hamann in *Farbe U. Lack 62*, 260, 323 (1956).*

Non-Stoichiometry

Since definite examples of pigment catalysis in paint cannot as yet be cited, it may be worthwhile to become slightly familiar with lattice defects and non-stoichiometry. We'll certainly be hearing a great deal on this subject in the future. In Moeller's *Inorganic Chemistry*, J. Wiley & Sons (1952), the following simple readable description appears:

"The law of definite proportions is one of the basic tenets of chemistry. There are, however, many instances of apparent departure from this rule among solid compounds. Such compounds do not possess the exact compositions which are predicted from electonic considerations alone and are commonly referred to as non-stoichiometric compounds. For examples, one may cite metallic hydrides such as $VH_{0.56}$, $CeH_{2.69}$; oxides such as $TiO_{1.7\text{-}1.8}$, $FeO_{1.055}$, $WO_{2.88\text{-}2.92}$, and many others, particularly among minerals.

Lack of true stoichiometry of this type is associated with so-called defect crystal lattices. Defects in a crystal lattice amount to variations from the regularity which characterize the material as a whole. They are of two types:

1. *Frenkel Defects*, in which certain atoms or ions have migrated to interstitial positions some distance removed from the "holes" which they vacated.

2. *Schottky Defects*, in which "holes" are left in random fashion throughout the crystal because of migration of atoms or ions to the surface of the material.

Obviously, detectable departures from true stoichiometry composition can result only if serious defects are present. It would follow, therefore, that many apparently stoichiometric compounds are not truly so. If excess metal is present in a crystal, it may be the result of partial reduction of high-valent cations, whereas if excess nonmetal is present, higher valent cations or lower valent anions than those normally present may be responsible. Many instances are known of multiple oxidation numbers in a single crystal. Nonstoichiometric compounds often show semi-conductivity, fluorescence, and centers of color."

Tailor-Made Solids

ACCORDING to H. G. Drickamer, of the University of Illinois, as quoted in *Chemical & Engineering News* of January 20, 1958, solid state physics has already contributed to making things like synthetic diamonds, cubic boron nitride, semiconductors, and isotactic polymers, and its theory can help to do such things as: 1) Create new solids with predictable properties, 2) Add impurities to materials to get specific effects, 3) Increase strength of materials by changing amount and nature of crystal dislocations, and 4) Develop new catalyst systems through the theory of solid surfaces.

---

*Condensation of this paper will be published in the April issue at Paint and Varnish Production.

 (*From page 42*)

synthetic rubber which is used for the preparation of inner tubes. They are also the basis for certain unsaturated polymers which possess some of the properties of drying oils which will be discussed in greater detail later.

Butadiene, as already indicated, may be copolymerized with styrene to obtain synthetic rubber and the vehicles for latex paints.

Thus, butadiene which is equally as important as styrene is responsible for a very important contribution to the protective coatings industry.

Acetylene as a Raw Material

Acetylene is a two carbon compound containing a triple bond. Thus, it has the following structure:

$$H-C\equiv C-H$$

acetylene

It is in a class of unsaturated hydrocarbons like ethylene, but methods for its production from ethylene or from other petrochemical-based products are quite recent. The traditional procedure for preparing acetylene is by the interaction of water with calcium carbide to provide lime and acetylene according to the following equation:

$$CaC_2 + 2H_2O \longrightarrow CH\equiv CH + Ca(OH)_2$$

The calcium carbide, in turn, was prepared from lime and coke in an electric arc furnace. In the last fifteen years, however, at least three other processes employing hydrocarbon raw materials have evolved for the preparation of acetylene. One of these, the so-called Schoch process, makes use of an electric discharge in an atmosphere of gaseous hydrocarbons which may vary in molecular weight from methane to kerosene. Acetylene and a variety of by-products are produced. However, this method is not currently in commercial use.

A method which is actually being used is the so-called Sachsse process. Here a partial oxidation of pre-heated hydrocarbon is effected with pre-heated oxygen. The hydrocarbon is usually natural gas. Since the oxidation is exothermic, it liberates sufficient heat to generate acetylene from the non-oxidized portion of the feed. In addition to acetylene, the oxidation products, carbon monoxide and hydrogen, are obtained. These, of course, are the components of synthesis gas.

Another practical process for preparing acetylene is the Wulff process in which a hydrocarbon ranging from methane to gasoline is heated rapidly in a regenerative furnace from 1000 to 1300°C. during a contact time of approximately 0.1 second.

Here the required heat is obtained by burning part of the charge in one furnace while the cracking of the rest of the feed takes place in a parallel furnace.

Acetylene is the parent material for the production of such products as vinyl chloride, vinyl acetate, polyvinyl alcohol, acrylonitrile, trichloroethylene, neoprene, and polyvinylpyrrolidone. Some of these have already been mentioned as important contributors to the protective coatings industry. Vinyl chloride, which as indicated above may also be made indirectly from ethylene, results when acetylene is treated with HCl in the presence of a catalyst according to the following equation.

$$CH\equiv CH + HCl \longrightarrow CH_2 = CH-Cl$$

Vinyl Chloride

A very important reaction is the treatment of acetylene with acetic acid to obtain vinyl acetate according to the following equation:

$$CH\equiv CH + CH_3COOH \longrightarrow CH_2=CHOOCCH_3$$

Vinyl Acetate

Vinyl acetate subsequently may be polymerized to polyvinyl acetate which is one of the important new vehicles for water base paints.

When polyvinyl acetate is saponified, polyvinyl alcohol results as the following equation indicates.

$$-(CH_2-\underset{\underset{OCOCH_3}{|}}{CH}-)_n \xrightarrow{H_2O} -(CH_2-\underset{\underset{OH}{|}}{CH})_n + nCH_3COOH$$

Polyvinyl alcohol is an important additive to latex paints since it provides body and helps to stabilize the dispersion.

Trichloroethylene which results from the chlorination of acetylene is of interest as a paint remover and also as a solvent. Polyvinylpyrrolidone which is made from acetylene, formaldehyde and ammonia has found use in synthetic blood plasma and hair sprays.

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GREAT NECK, NEW YORK • PLANT: NEW MARKET, N.
SELECTS M.P. 270-280°F. AND 290-305°F.
"JET" M.P. 320-330°F.
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BLACK—UNIFORM VISCOSITY M.P. 340-360°F.
CARLOAD AND LESS CARLOAD STOCKS
AVAILABLE FOR IMMEDIATE SHIPMENT
ZCO

EXTERIOR STUDIES

(*From page 35*)

not as light stable as the black iron oxide and raw sienna used in the gray tint, the results over the range from 30 to 50 per cent pigment volume concentration are practically identical with those obtained with the gray, with the exception that actual color retention, measured as difference between the exposed portion and the unexposed portion of the panel, seems to be better at the higher pigment volume concentrations. There is no difference in dirt collection, very little difference in chalking, and protection rating panels is very good.

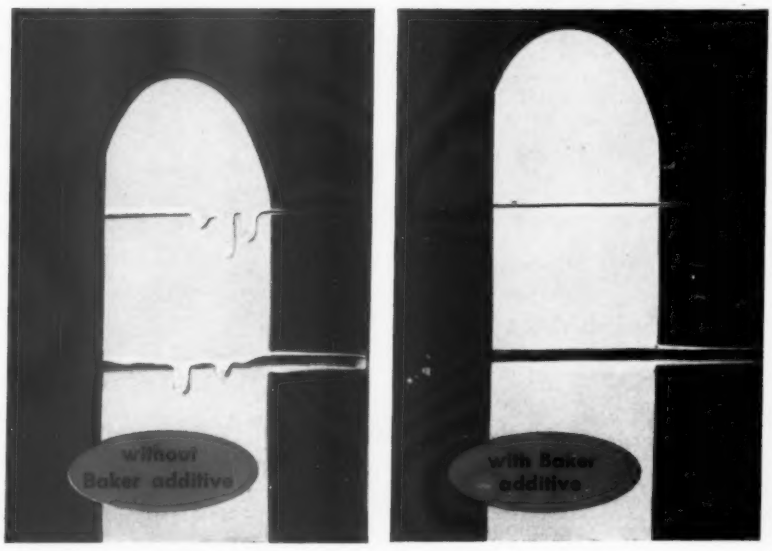
(4) Modification of paints with bodied linseed oil or long oil, 100 per cent solids alkyd can be accomplished by first emulsifying the oil or alkyd in a system in which part of the emulsifier is ammonium oleate, and where the emulsion has been carried to the point where it is an oil-in-water type emulsion. Modified russet formulations show good durability where the modifying vehicle comprises 37 per cent of the total vehicle solids by weight in pigment volume concentration ranges of 35 to 50 per cent. There is some reduction in color retention and some increase in chalking but the protection rating and dirt collection are generally quite comparable. In pigment volume concentrations of 35 per cent, where the modifying vehicle comprises 75 per cent of the total vehicle solids by weight, the differences are greater and tend to be more like the oil or alkyd modifying vehicle. The color retention is poorer; the chalking rate is higher although the panels seem to remain clean; and there is no loss of protection rating for the two years of the study period.

(5) Differences in mildew collection between freshly primed cedar panels and similar cedar panels with a chalking oil paint system on them seem to be explained by the fact that the oil type primer had no fungicide in the formulation. This stresses the importance of a fungicidally protected primer for any topcoat system if mildew collection is to be studied or if it is a problem.

The results of this work and the corroboration of the data published here have been confirmed in practical exposures made on houses in a number of different climatic areas in the United States.

One peculiarity, the occurance in some checking and cracking in high anatase content paints in southern Florida is being explored further in the hope that an explanation will be available.

Data recorded here are those obtained from the panels exposed at Santa Clara, California. Similar data from the Springfield and the Florida exposure station are available upon request.



Improve sag resistance

Both paint draw-downs above were wiped with a special "sag liner" and placed vertically immediately after applying to show how Baker additives provide unsurpassed sag resistance. Other benefits? Improved brushability, outstanding pigment suspension, controlled penetration, and thixotropic viscosity . . . required features for today's discriminating paint buyers.

Choose either THIXCIN® R or M-P-A®, whichever meets your formulation requirement. Generally, THIXCIN R is best for paints processed at moderate temperatures (90-120° F) and employing low KB solvents and oil vehicles. M-P-A, on the other hand, is effective for paints made at high temperatures (130-180°F) or using high KB solvents. M-P-A will not seed under any paint processing conditions.

Make this sag test yourself . . . "sag liner" free on request.

THE Baker CASTOR OIL COMPANY
ESTABLISHED 1857
40 AVENUE A, BAYONNE, N. J.

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For the suspension of pigments

If you need a better anti-settling agent try

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Texaphor is liquid,
Texaphor is economical,
Texaphor does not reduce gloss,
Texaphor can be used in any coating, with any pigment, and any binder at any stage of manufacturing.

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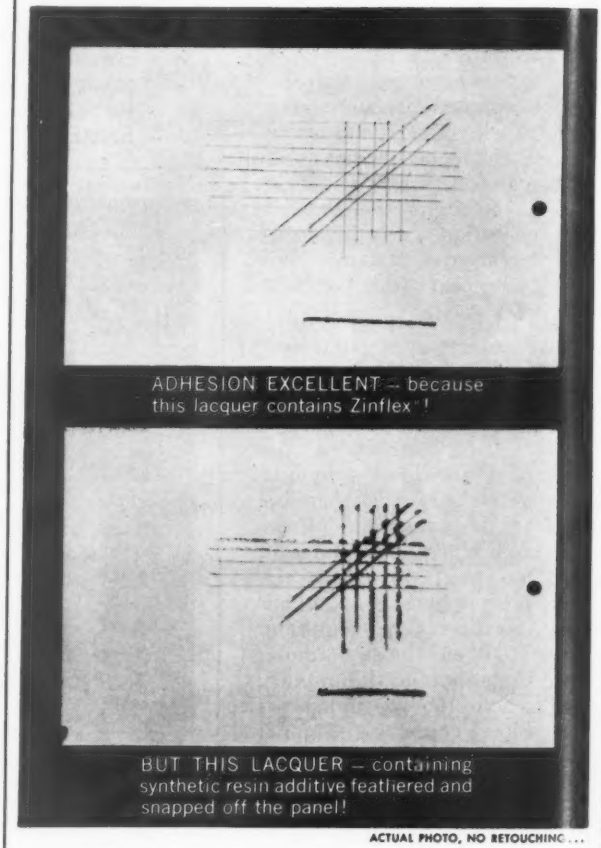
A 53 157

How does your metal lacquer stand the "crosshatch" test?


ADHESION EXCELLENT – because this lacquer contains Zinflex®!
BUT THIS LACQUER – containing synthetic resin additive feathered and snapped off the panel!

ACTUAL PHOTO, NO RETOUCHING . . .

ADHESION is only one of the exceptional properties Zinflex can give your metal lacquers, without impairing hardness or build! It also improves FLEXIBILITY . . . MAR RESISTANCE . . . and gives you BETTER COLOR RETENTION. You can add more of this partially esterified, wax-free shellac—because Zinflex has been modified for greater compatibility with hydrocarbon diluents customarily used in lacquer formulations.

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MAKERS OF BULLS EYE® SHELLAC PRODUCTS

CALENDAR OF EVENTS

Mar. 19-22. 22nd Annual Convention of Southern Paint and Varnish Production Club, Atlanta Biltmore, Atlanta, Ga.

April 13-16. ACS Spring Meeting, Div. of Paint, Plastics and Printing Ink Chemistry, San Francisco, Calif.

May 1-3. Southwestern Paint Convention and Raw Material Exhibit, Statler-Hilton Hotel, Dallas, Tex.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Columbus — Jan., June, Sept., Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Ship Ahoy Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Wednesday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

Joseph Weiss Dies

Joseph S. Weiss, editor and publisher of Paint Industry Magazine died suddenly on Feb. 24th in Philadelphia.

He was president of the Heckel Publishing Co. and originator of the G. B. Heckel Paint Industry Award.

•

Sales Agent Appointed

The Jesse S. Young Co. has been named sales agent for Farnow, Inc., it has been announced by Benjamin Farnow, president.

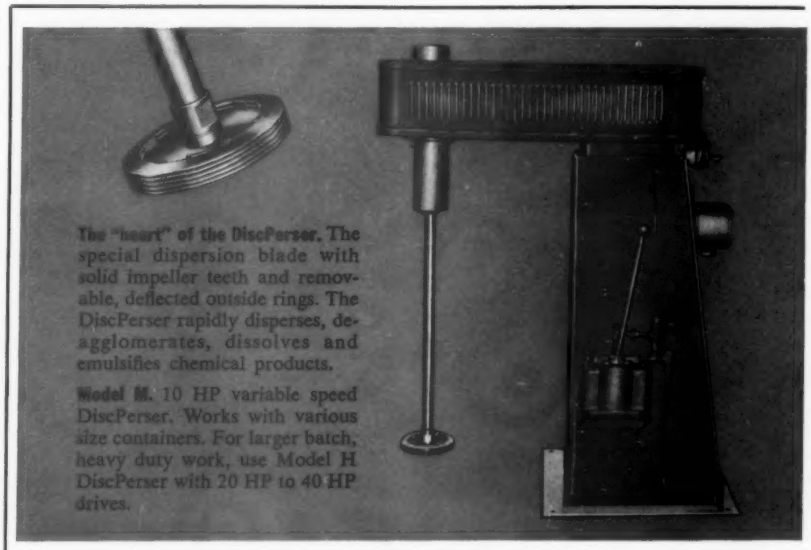
The sales firm will represent Farnow in parts of the New York-New Jersey metropolitan area.

Chemical Division Formed

National Cylinder Gas Co. has consolidated its chemical activities into a new chemical products division, it has announced.

Walter H. Girdler, Jr., has been named to head the new division, it has also been announced by Charles J. Haines, president of the firm.

The chemical products division is to include the Holland Color and Chemical Co., supplier of dry and flushed organic colors to the paint industry. Also included in the new division are the Girdler Catalyst business, Crestwood Chemical Co. and Dunham Chemical Co.



The "heart" of the DiscPerser. The special dispersion blade with solid impeller teeth and removable, deflected outside rings. The DiscPerser rapidly disperses, deagglomerates, dissolves and emulsifies chemical products.

Model M. 10 HP variable speed DiscPerser. Works with various size containers. For larger batch, heavy duty work, use Model H DiscPerser with 20 HP to 40 HP drives.

NOW! A finished dispersion in a single operation!

The new HOCKMEYER DiscPerser . . . produces very rapid ultimate dispersion...handles high-viscosity materials!

The DiscPerser's special blade operates at peripheral speeds in excess of 6000 FPM. The solid impeller teeth shred and break up pigment agglomerates. Material is discharged through the slots between the rings, at great speed and under intense hydraulic pressure. Tremendous fluid hammer action is developed by the smashing of material against the surfaces of these deflected outside rings. Material leaves the blade in thin, high-speed jet streams. Impact on the slower moving surrounding material creates further attrition and speeds the breakdown to original pigment particle size.

Versatile, the HOCKMEYER DiscPerser also: ● Cold cuts and dissolves exceptionally fast. ● Tints and lets-down unusually efficiently. ● Pre-mixes heavy bases for mill equipment; greatly increases the milling operation.

TRY IT AT OUR EXPENSE. The HOCKMEYER DiscPerser can increase your production, improve your product, save you money. Try it *free* in your own plant. Write for details and free descriptive folder. *Act now!*

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For details of how you can try the HOCKMEYER DiscPerser *free* in your plant and for a free, illustrated DiscPerser folder, clip this coupon . . . mail it today! **PVP-38**

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TECHNICAL Bulletins

WET GROUND MICA

Technical Bulletin No.34 has been announced by the Wet Ground Mica Assoc., 420 Lexington Ave., New York, N.Y.

The bulletin inaugurates a series on "Studies on the Influence of Mica on the Water Vapor Permeability of Paint Films."

The series is to study platy wet ground mica's influence, considering such factors as the effect of pigment/volume concentration, the effect of the particle size of the mica pigment, the effect of the selection of the vehicle and the effect of the eventual pretreatment of mica.

The bulletin is concerned with studies of paints with low pigment/volume concentration. Research described in the bulletin is being carried on by Julio J. Rivera and Herman Abramsky under the direction of Dr. Max Kronstein of New York University.

NITROGEN GENERATORS

A four-page bulletin describes self-contained, packaged Nitrogen Generators produced by Gas Atmospheres, Inc., Dept. PVP, 20011 W. Lake Road, Cleveland, Ohio.

The bulletin contains illustrations of typical installations and a description of a new simplified one-station control panel. Charts of the over-all dimensions, weights of all standard sizes and operating costs are included in the literature.

V-BELTS

Testing, inspection and quality control of V-belts is the topic of a bulletin released by Goodyear Tire & Rubber Co., Dept. PVP, Akron 16, Ohio.

The 16-page booklet is the fourth in a series, and it describes in words and pictures how raw materials and finished belts are tested and inspected. One section of the booklet explains quality control procedures, another is concerned with experimental production.

The title of the booklet, S-S1107, is "V-belts, the Testing, Inspection and Control of their Quality."

FORK TRUCK SAFETY

Tips on operating fork lift trucks more safely are contained in an eight-page, two-color brochure now available from Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

The brochure is fully-illustrated with a series of cartoon-type drawings, and it points out specific safe operating practices and serves as a guide in setting up a fork truck driver training course.

Among the topics discussed are selecting operators, classroom instruction, driving instructions and maintenance responsibilities of of the trained operator.

PUMP MOTORS

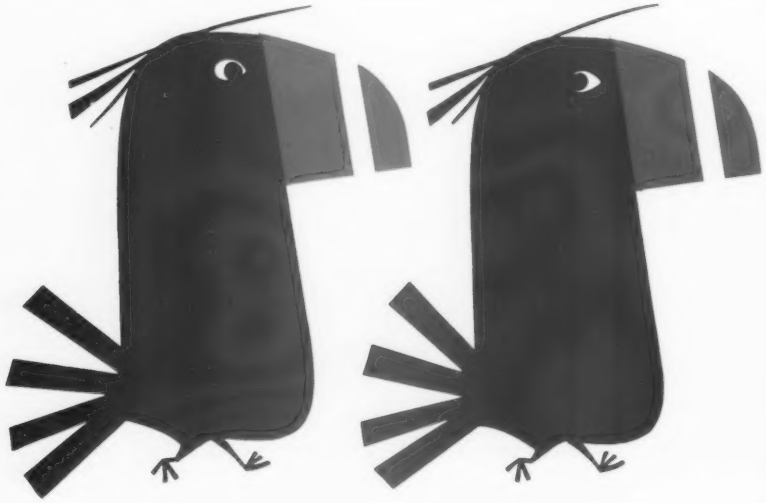
Pump motors from ⅛ to 1,000 horsepower are discussed in a four-page, two-color bulletin released by Reliance Electric and Engineering Co., Dept. PVP, 24701 Euclid Ave., Cleveland 17, Ohio.

Photos and copy explain the features of the pump motors and the Reliance partial motor concept for attaching the machined motor frame directly to a pump frame to form an integrated unit.

The bulletin is designated B-2.07.

PHENOLIC PRODUCTS

An illustrated brochure describing a complete line of phenolic resins, varnishes and molding powders has been issued by General Electric Co., Chemical Materials



Birds of a feather go together... and so do highest quality and top technical service when you buy **Witco-Continental pigment blacks.** Rigid manufacturing standards insure uniformity in Witcoblaks... guarantee satisfaction every time in your paint and lacquer formulation results. There's a Witcoblak exactly right for your application.

You can't buy better. **Witco Chemical Company**
Continental Carbon Company
122 East 42nd Street, New York 17, N. Y.

Chicago • Boston • Akron • Atlanta • Houston • Los Angeles • San Francisco
London and Manchester, England

Dept., Dept. PVP, One Plastics Ave., Pittsfield, Mass.

The 12-page catalog contains detailed technical data, special properties and product features of phenolic molding powders, rubber phenolic molding powders, phenolic laminating varnishes, phenolic foundry resins, "Methylon" coating resins and industrial resins and varnishes.

The two-color booklet is designated CDC-344.

SOLVENTS AND CHEMICALS

An eight-page buyers' guide has been published by American Mineral Spirits Co., Dept. PVP, Murray Hill, N.J. The guide is titled "Amsco Chemicals-Building Blocks for Industrial Progress."

The technical brochure presents chemical formulae and test results on alcohols, esters, glycols, ketones, chlorinated solvents, plasticizers and miscellaneous solvents. A solvent resin guide for the solvents is also included.

X-RAYS

A 16-page booklet titled "Questions and Answers on X-ray Diffraction, Diffractometry and Spectrography" has been made available by the Instruments Division, Philips Electronics, Inc., Dept. PVP, 750 S. Fulton Ave., Mount Vernon, N.Y.

The booklet contains 71 questions and answers which cover points most frequently raised by people who have attended Norelco X-ray Diffraction schools during the past ten years. Data deals with camera, diffractometer and spectrograph equipment and techniques.

The publication explains specimen preparation and describes fields of application for the three basic X-ray analysis methods. It also discusses the selection of analyzing crystals and calibration of the spectrograph for quantitative work on elements.

PIGMENT COLORS

The Harshaw Chemical Co., Dept. PVP, 1945 E. 97th St., Cleveland 6, Ohio, has announced a price list for pigment colors.

Included in the listings are Aurasperse colors, C.P. Cadmiums, lithopones, cobalt aluminate, organic lakes and toners, pulp colors (lakes and toners) and sun yellows.

PROCESS EQUIPMENT

Special purpose machinery, including mixing, blending and other process equipment is described in Bulletin No. PE-5802 issued by The H. W. North Co., Process Equipment Division, Dept. PVP, P. O. Box 9051A, Birmingham 9, Ala.

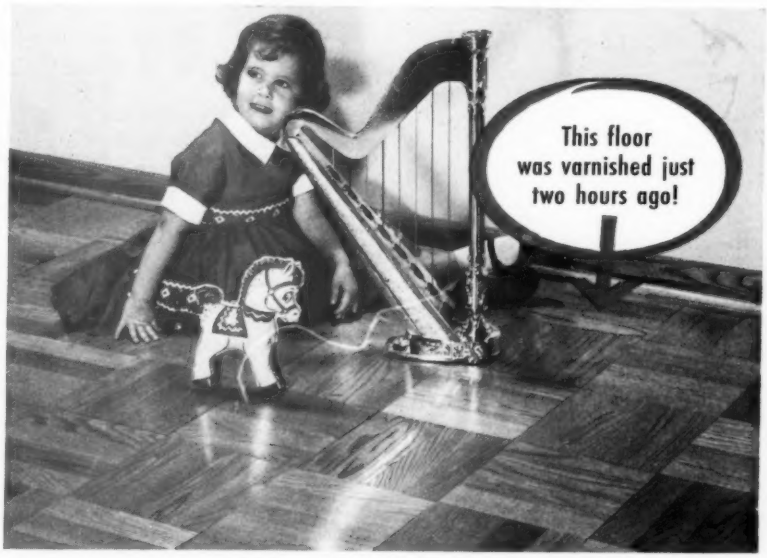
The four-page folder contains photographs and brief descriptions of the various types of equipment being offered by the process equipment firm.

RADIOACTIVE ISOTOPES

Price List "C" covering radioactive isotopes and isotope-labeled compounds has been published by Bio-Rad Laboratories, Dept. PVP., 802 Delaware St., Berkeley, Calif.

The publication adds to previous issues an expanded list of carbon-14 compounds and new sections describing heavy water, deuterium and tritium-labeled compounds and new nitrogen-15 compounds of high isotopic concentration.

Included in the alphabetical listings are acids and derivatives, amino acids, purines, aldehydes and ketones, hydrocarbons, alcohols, and benzene-ring-labeled compounds.



Now—marproof varnishes with Cargill Polyurethane 101

This new one-package-system polyurethane can help you formulate versatile, extremely tough varnish with these benefits:

- Fast dry
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Cargill Polyurethane gives you all these features, and more. See for yourself what new Cargill Polyurethane 101 can do in your formulations . . . Call, write or wire today—for a sample and comprehensive product brochure.

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Basic suppliers to the coatings industry

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New! DAVIES PROTECTO-RING

Davies *Protecto-Ring* paint cans give you more protection because the raw metal edge is completely coated. This exclusive feature* costs no more, yet greatly increases shelf life of your product.

Davies three container plants in Cleveland, Conneaut and Massillon, Ohio, have 96 years combined experience in safe and sure product protection. Davies lithographing and design service matches the quality of our containers.

The raw metal edge on the inside curl of the Davies *Protecto-Ring* is completely coated right in the manufacturing operation.

*Patent Pending

THE DAVIES CAN CO. • 8007 Grand Ave., Cleveland 4, Ohio

CYANAMID

PRODUCT NEWS

CYAQUA* 405-20

THE STABLE ALKYD EMULSION

amazing flat paint vehicle combines best features of latices and alkyds

CYAQUA emulsion paints

- contain no organic solvents, casein or protein
- brush out evenly and easily
- clean up readily with water
- have no "stage" in the dry
- produce dead flat sheen
- have excellent adhesion
- hide well in one coat
- resist scrubbing

CYAQUA emulsion

- has unusual stability
- good freeze—thaw resistance
- has excellent emulsifying and dispersing characteristics
- disperses pigment readily, tolerates high pigment loading
- does not form irreversible solid at any drying stage
- does not clog equipment
- contains no external plasticizer, thickener, antioxidant or protein
- non-foaming
- excellent compatibility with latices

*Trademark

AMERICAN CYANAMID COMPANY
PLASTICS AND RESINS DIVISION
34-P Rockefeller Plaza, New York 20, N. Y.

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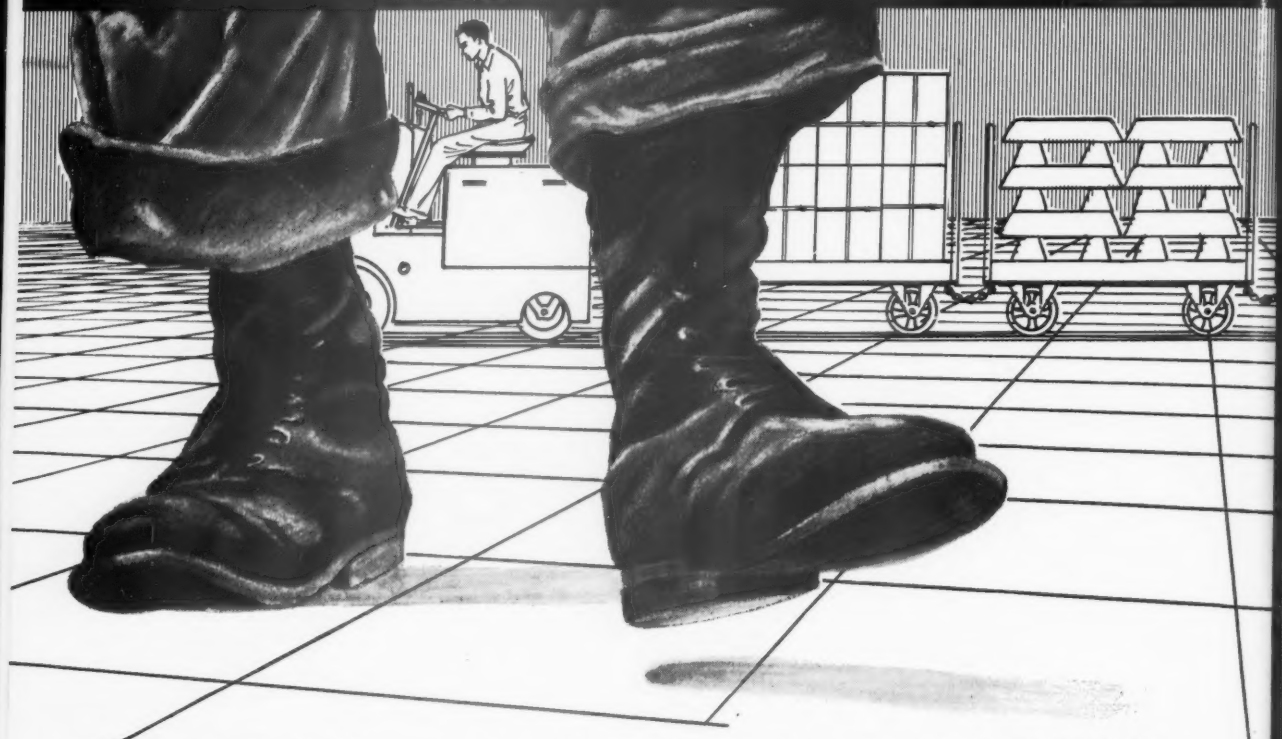
Important Improvement in EMULSION FLOOR PAINTS

with GK HYDRITE PD-10



Georgia Kaolin Company, recognizing the important new market for EMULSION FLOOR PAINTS, instituted a research program to determine the effect of extenders on the principal physical properties of these emulsion floor paints.

PD-10 significantly improves the following properties:

1. MAXIMUM ABRASION RESISTANCE
2. REDUCED DIRT PICK-UP
3. IMPROVED CLEANSIBILITY
4. HIGHEST GLOSS

Contact Georgia Kaolin Company or the nearest GK distributor for further information regarding the use of HYDRITE PD-10 in EMULSION FLOOR PAINTS.

GEORGIA KAOLIN COMPANY

433 NORTH BROAD ST., ELIZABETH, N. J.

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